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# SATURN SA-5 POSTFLIGHT TRAJECTORY (U)

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Aero-Astroynamics Laboratory

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SATURN SA-5 POSTFLIGHT TRAJECTORY (U)

By

Gerald R. Riddle and Michael Naumcheff

(U) ABSTRACT

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This report presents the postflight trajectory for the Saturn SA-5 test flight. Trajectory dependent parameters are given in earth-fixed, space-fixed, and geographic coordinate systems. A complete time history of the powered flight trajectory is presented at 1.0 sec intervals from first motion through insertion. Tables of insertion conditions and various orbital parameters are included in a discussion of the orbital portion of flight. A comparison between nominal and actual trajectory dependent parameters is also presented.

*uncl.*

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SATURN SA-5, POSTFLIGHT TRAJECTORY (U)

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FLIGHT EVALUATION AND OPERATIONS STUDIES DIVISION  
AERO-ASTRODYNAMICS LABORATORY

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(U) TABLE OF CONTENTS

	Page
SUMMARY	1
1.0 INTRODUCTION	2
2.0 COORDINATE SYSTEMS AND TRAJECTORY PARAMETERS	2
3.0 POWERED FLIGHT TRAJECTORY ANALYSIS	3
3.1 Data Sources	3
3.1.1 Antenna Locations	3
3.1.2 MISTRAM	4
3.1.3 Radar Altimeter	4
3.1.4 Patrick (0.18) Radar (FPQ-6)	5
3.2 Data Utilization	5
3.2.1 First Motion Time	8
3.3 Error Analysis of Reference Trajectory	8
4.0 ACTUAL AND NOMINAL POWERED TRAJECTORY	10
4.1 Powered Flight	10
4.1.1 Thrust Decay	11
4.1.2 Separation	12
4.2 S-I Booster Trajectory After Separation	13
5.0 ORBITAL FLIGHT	15
5.1 Orbital Analysis	15
5.2 Orbital Tracking Performance	17
APPENDIX	138

(U) LIST OF ILLUSTRATIONS

Figure	Title	Page
1	AVAILABLE FINAL TRACKING DATA	19
2	TRACKING STATIONS	20
3	ANTENNA LOCATIONS AND VEHICLE CENTER OF GRAVITY VERSUS RANGE TIME	21
4	ALTITUDE COMPARISON	22
5-7	TRACKING COMPARISONS (POWERED FLIGHT)	23-25
8	FREQUENCY RESPONSE OF SMOOTHING COEFFICIENTS	26
9	ESTIMATED UNCERTAINTY OF REFERENCE TRAJECTORY	27
10	S-I TRAJECTORY	28
11	S-IV TRAJECTORY	29
12	LONGITUDINAL ACCELERATION	30
13-14	EARTH-FIXED VELOCITY	31-32
15	MACH AND DYNAMIC PRESSURE	33
16	RELATIVE S-I/S-IV LONGITUDINAL TRANSLATION DISTANCE	34
17	RELATIVE S-I/S-IV LONGITUDINAL ACCELERATION AND VELOCITY AFTER SEPARATION	35
18	BOOSTER TRAJECTORY GROUND TRACK	36

(U) LIST OF ILLUSTRATIONS (CONT)

Figure	Title	Page
19	ANTIGUA RADAR RESIDUALS	37
20	JOHANNESBURG, SOUTH AFRICA MINITRACK RESIDUALS	38
21	SA-5 RADAR SKIN-TRACK PERFORMANCE	39
22	EARTH-FIXED COORDINATE SYSTEM	40
23	GEOGRAPHIC COORDINATE SYSTEM	41

(U) LIST OF TABLES

Table	Title	Page
I	TRACKING DATA SOURCES	42
II	TIMES OF EVENTS	43
III	SIGNIFICANT TRAJECTORY PARAMETERS (S-I BOOSTER)	44
IV	CUTOFF CONDITIONS	45
V	BOOSTER FREE FLIGHT TRAJECTORY	46
VI	ORBITAL ELEMENTS AT INSERTION	47
VII	EARTH-FIXED POSITIONS AND VELOCITIES	48
VIII	SPACE-FIXED POSITIONS AND VELOCITIES	66
IX	EARTH-FIXED AND SPACE-FIXED ACCELERATIONS	84
X	ALTITUDE, RANGE, EARTH CENTERED DISTANCE, LATITUDE AND LONGITUDE	102
XI	EARTH-FIXED VELOCITY VECTOR, MACH NUMBER, DYNAMIC PRESSURE, ELEVA- TION AND AZIMUTH ANGLE OF EARTH- FIXED VELOCITY VECTOR, AND SPACE- FIXED VELOCITY VECTOR.	120

(U) LIST OF SYMBOLS

Symbol	Definition
LATITUDE	Geodetic Latitude
EARTH VEL	Magnitude of Earth-Fixed Velocity Vector
VEL ELEV ( $\epsilon$ )	Elevation of the Earth-Fixed Velocity Vector Referenced to Local Horizontal
VEL AZ ( $\alpha$ )	Azimuth of the Earth-Fixed Velocity Vector Measured From North
SPACE VEL	Magnitude of Space-Fixed Velocity Vector
IECO, OECO, S-IV CO	Inboard, Outboard, and S-IV Engine Cutoff, Respectively
PITCH ANGLE	Angle From Local Geocentric Vertical to Earth -Fixed Velocity Vector

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(U) SUMMARY

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The actual trajectory of SA-5 was close to the nominal. Total velocity was 31.23 m/sec higher than nominal at OECO, 27.0 m/sec higher than the nominal (assuming  $3\sigma$  S-IV propellant utilization (P. U.) system operation) at S-IV CO and 28.5 m/sec higher than nominal at orbital insertion (S-IV CO + 10 sec). At S-IV CO the actual altitude was 6.5 km higher than nominal and the range was 18.5 km longer than nominal.

A relatively large lateral deviation, attributed to thrust vector misalignments, was experienced on this flight. The cross range velocity deviated 33.9 m/sec and 45.6 m/sec to the left of nominal at OECO and S-IV CO, respectively.

A theoretical free-flight trajectory of the separated S-I booster indicates that the impact ground range was 17.9 km longer than nominal. Impact, assuming the booster remained intact, should have occurred between 566 and 626 sec, depending on the re-entry attitude.

The S-IV payload at orbital insertion had a space-fixed velocity of 28.5 m/sec greater than predicted, a perigee altitude of 262.3 km and an apogee of 771.4 km, giving a nominal lifetime of 451 days, 165 days longer than predicted.

Author

## 1.0 (U) INTRODUCTION

The SA-5 Saturn vehicle was launched from Cape Kennedy on January 29, 1964 at 11:25:01 Eastern Standard Time. Approximately 10 min and 40 sec after launch the S-IV stage with instrument unit and Jupiter nose cone was inserted into orbit.

This report presents the postflight mass point trajectory in tabular form from first motion to insertion in Tables VII through XI. Also presented are detailed discussions of data sources and their utilization, estimated accuracies of the trajectory, and a comparison of actual and nominal trajectory parameters. A table of insertion conditions and various orbital parameters is included in the discussion of the orbital portion of flight. An analysis of the various orbital tracking networks is also presented.

All times listed in the tables are referenced to Range Zero (11:25:01 EST), unless otherwise noted. The time of first motion was assumed to occur 0.31 sec after Range Zero.

Acknowledgement is given to the Data Reduction Branch of the Computation Laboratory for their efforts in the preparation of the tabulated trajectory data and to the General Electric Trajectories Programming Unit for programmer support in orbit determination.

## 2.0 (U) COORDINATE SYSTEMS AND TRAJECTORY PARAMETERS

The translational motion of the vehicle's center of gravity is described in several coordinate systems. An initial displacement of 31.9 m locates the center of gravity in the coordinate system whose origin lies on the reference ellipsoid. Definitions of the coordinate systems are found in the Appendix.

The Clarke Ellipsoid of 1866 was used to represent the earth and its gravitational field. Launch pad coordinates are defined with respect to the ellipsoid.

The geographical coordinates and gravity data for Launch Pad 37B at Cape Kennedy are:

Geodetic Latitude:	28.531423° N
Longitude:	80.565168° W
Gravity:	9.79249 m/sec <sup>2</sup>

Elevations above the reference ellipsoid are:

Base of launch pedestal:	4.9 m
C. G. at first motion:	31.9 m

Launch Azimuth: 90° E of N.

Flight Azimuth: 105° E of N.

ST-90S Platform Azimuth: 105.000° E of N.

### 3.0 (U) POWERED FLIGHT TRAJECTORY ANALYSIS

#### 3.1 Data Sources

The tracking data available through the powered portion of flight are summarized in Figure 1 and itemized in Table I. The relation between the SA-5 flight path and the various tracking sites is shown in Figure 2. The quality of the data in general was fair. The downrange radars at G.B.I. (3.16), San Salvador (5.16), and Antigua (91.18) experienced large random errors and abrupt data shifts. These abrupt shifts cause large portions of data to be unreliable; consequently, the data are not very useful in establishing the trajectory. Low signal strength, cross polarization, and antenna "seeking" are some possible causes of poor acquisition of data. It is believed that antenna "seeking" was the primary cause of very pronounced errors in the Y-component of certain radar data. Random error in the Y-component data ranged from approximately 30 m in the G.B.I. (3.16) radar to approximately 150 m in the Antigua (91.18) radar.

##### 3.1.1 Antenna Locations

Figure 3 shows the location of the antenna for the various tracking systems and the vehicle center of gravity versus time. The tracking data used in establishing the trajectory were transferred to the vehicle center of gravity to provide a common reference point for all of the tracking systems.

### 3.1.2 MISTRAM

SA-5 was the second engineering test of the Missile Trajectory Measurement (MISTRAM) System on a Saturn vehicle. Tracking data in the earth-fixed plumline coordinate system were received during the following intervals:

<u>Range Time (sec)</u>	<u>Source</u>
35.20 to 146.50	Valkaria, includes Eleuthera
152.00 to 329.45	Passive Track from 152 to 329 sec.
332.00 to 620.00	Eleuthera, includes Valkaria Passive Track from 362.00 to 511.80 sec.

A statistical least square solution utilizing active and passive tracking data was used to obtain the final earth-fixed parameters.

Prior to approximately 500 sec the random error was small and there was little or no cyclic error present. The one sigma total errors of position and velocity data were 20 m and 0.5 m/sec, respectively, at 500 sec. After 500 sec the data became increasingly more erratic. At 530 sec the data experienced an abrupt shift. This shift amounted to 50 m in the Y-component of the position data and an excursion of 107 m/sec in the Y-component of the velocity data. The reliability of the data after this time is questionable. In addition to the increase in random error, the amplitude of the cyclic error increased to approximately 9 m/sec in the Y-component of velocity with a frequency of approximately 0.1 cps.

### 3.1.3 Radar Altimeter

SA-5 was the second engineering test of the radar altimeter on a Saturn vehicle. The output from the altimeter was 36 samples per second. The PCM telemetry system sampled each altimeter output three times.

The reliability of the altimeter data was very questionable. According to the altimeter reliability signal, very little valid data were obtained prior to 500 sec range time. The altimeter output

was averaged over a one sec interval and compared with the reference trajectory altitude from 500 sec range time to S-IV CO. The results of this comparison are shown in Figure 4. Although the random error was reduced, differences ranged from approximately -560 m to +200 m during the interval from 530 to 630 sec range time.

### 3.1.4 Patrick (0.18) Radar (FPQ-6)

The 0.18 radar system was programmed to track the discarded S-I booster after separation. Reliable tracking data were acquired until 367 sec range time. Before separation the 0.18 radar differed with the reference trajectory by less than 100 m (see Figures 5, 6, and 7 for a comparison of various tracking data with the reference trajectory) in position data and less than 2 m/sec in velocity data.

## 3.2 Data Utilization

External tracking data and telemetered guidance data were used to establish the postflight trajectory as presented in Tables VII through XI. The trajectory, as presented, was constructed in the following manner.

- |                   |   |
|-------------------|---|
| 0.0 - 30.0 sec:   | Regular Fixed Camera and UDOP data were used in a least squares curve fit. The differences between the resulting curve fit and the actual data were negligible. Reference 2 discusses in detail the least squares program used to establish this portion of the trajectory. |
| 30.0 - 70.0 sec:  | UDOP data processed by a smoothing and differentiation program (see the following paragraphs for more discussion on the smoothing and differentiation program).   |
| 70.0 - 136.0 sec: | Azusa data processed by a smoothing and differentiation program.  |

136.0 - 154.0 sec: Azusa position data processed by a smoothing and differentiation program. Telemetered guidance data were used to determine the velocity and acceleration components' profile.

154.0 - 220.0 sec: Azusa data processed by a smoothing and differentiation program.

220.0 - 639.97 sec: A computed trajectory based on telemetered guidance velocity data, Azusa tracking data, and Antigua (91.18) radar tracking data. (See the following paragraphs for more discussion on the computed trajectory.)

Since the trajectory was constructed from several different data sources, it was necessary to provide for a merging or blending process to compensate for small biases that existed between data from the various sources. A merging program was used to connect the data from the different sources without creating a sharp transient. This was accomplished by utilizing a least squares technique.

Onboard telemetered guidance velocity data in conjunction with external Azusa tracking data and Antigua (91.18) radar tracking data were used to construct the trajectory during the interval from 220.0 sec to 639.97 sec. The telemetered guidance velocities were integrated and adjusted to provide continuous earth-fixed position data. The program used to generate this position data is described in Reference 8. The position data were smoothed and differentiated to provide velocity and acceleration data in the earth-fixed system. A least squares procedure using a three by three constant error coefficient matrix was used as an approximation to define the guidance accelerometer error model. In determining the error model, it was assumed that the guidance data had systematic errors of a known form, which were dependent upon unknown coefficients. The external tracking data were used to estimate these unknown bias (differential correction) coefficients. The inertial guidance data were adjusted,

based on the adjustment or bias coefficients, and a new estimate of the trajectory was computed. The external tracking data used to determine the bias coefficients were individually weighed to account for data reliability.

An analysis of downrange tracking data from the SA-4 Saturn test revealed that the smoothing technique in use would be insufficient for reducing large random and cyclic errors inherent in radar data. As a result of this analysis, a frequency response study was conducted on various combinations of smoothing coefficients. Desirable results were obtained when fourth degree coefficients were averaged with second degree coefficients covering a twenty sec interval (i. e., 101 points at a data frequency of 0.2 sec or 201 points at a data frequency of 0.1 sec, etc.). The amplitude of data oscillating at approximately 0.1 cps was reduced 90% with less than 0.1 m bias being induced. The frequency response curve of the coefficients is shown in Figure 8. These averaged coefficients were used to smooth the position data. However, fourth degree least square coefficients covering the same time interval were used to obtain velocity and acceleration data because the averaged coefficients would induce significant bias errors in the derivatives of position data during particular phases of the trajectory.

UDOP and Azusa data were smoothed using least square coefficients covering a 10 sec interval. It was determined that the 10 sec interval would be sufficient because UDOP and Azusa systems did not experience significant cyclic errors.

A standard deviation calculation routine was also incorporated into the smoothing operation to provide a measure of the internal consistency of a data system. The calculated standard deviations proved very helpful in the analysis of various tracking data. By considering the standard deviation, the elevation angle, and the signal strength of a particular data system, the reliability of certain portions of data could be determined.

The calculation of the standard deviation is based on the least square smoothing coefficients. A smoothed position and its derivatives are obtained at a particular time by operating on the raw data with the smoothing coefficients. Projected data based on the smoothed position

and its derivatives are generated a specified number of points on each side of this time point. The actual variance (internal consistency) of a particular data is then determined by comparing the projected data with the raw data. A more detailed discussion of the smoothing technique and the standard deviation calculation can be found in Reference 3.

### 3.2.1 First Motion Time

Pad measurements 32-B01 and 32-B02 (Displacement at Stub Fins I and III), longitudinal acceleration, and vehicle displacement as measured from camera data were available for the determination of first motion time. The first motion time indicated by each measurement is given in the following table.

<u>Measurement</u>	<u>Range Time (sec)</u>
32-B01 and 32-B02	0.18
Longitudinal Acceleration	0.22
Camera Data	0.31

The camera data were used to determine first motion time on SA-5 since they were readily available and since reduction people felt that the camera frame rate indicated an accuracy of  $\pm 5$  milliseconds. The telemetered longitudinal acceleration was invalid during the first 5 sec of flight; therefore, this measurement was not considered reliable. The bad data were apparently due to vibration. Information concerning the pad measurements was received after the early engineering evaluation was almost completed so the first motion time, as established by camera data, was not changed. However, it is felt that the pad measurement data are most correct. A decision was made by the Flight Evaluation Working Group to use pad measurements for the determination of first motion time on SA-6 and all subsequent flights.

### 3.3 Error Analysis of Reference Trajectory

During the S-I and initial S-IV powered portions of flight, good coverage was provided by the 1.16 radar, UDOP and Azusa tracking systems. The UDOP and Azusa data were used to establish the reference trajectory over this time. The available tracking data for the later portion of S-IV powered flight were not too satisfactory;

therefore, the telemetered guidance velocities were used as a constraint for the tracking. Data from the various tracking sources are compared with the reference trajectory in Figures 5 through 7. All data were smoothed and transferred from the point of track (beacon location) to a common point, the vehicle center of gravity. These curves show only the trend of the data relative to the reference trajectory; however, the shifts that occurred in the data are made readily apparent in these curves.

The dispersion of the various data gives an indication of the validity of the reference trajectory. The maximum difference between the 1.16 radar, UDOP, and Azusa tracking systems from 50 to 200 sec was less than 50 m in the Y-component, 25 m in the X-component and 10 m in the Z-component. The majority of this deviation is attributed to the radar data. Fairly large deviations are present for the time after 200 sec, with a maximum difference of 450 m in the Y-component.

An estimate of the probable total uncertainty in the reference trajectory is shown in Figure 9. At IECO the position components are probably accurate to between 5 - 20 m and the velocity components to between 0.1 - 0.3 m/sec. By S-IV CO the maximum uncertainties increase to about 1 m/sec in the velocity components. The uncertainties in position components are about 50 m in Z, 70 m in X and 500 m in Y.

A comparison of several parameters at insertion from the trajectory established using powered flight ascent tracking and telemetered guidance with those from orbital tracking is shown below.

<u>Parameter</u>	<u>Postflight Reference</u>	<u>Reference Minus Orbit Determination</u>
Vector Distance from Launch		
Site (km)	2219.92	-0.11
Ground Range (km)	2170.48	-0.68
Altitude (km)	262.78	0.40
Earth-Fixed Velocity (m/sec)	7479.88	0.73
Position Components		
XE (km)	2216.66	-0.09
YE (km)	-118.08	0.46
ZE (km)	22.82	0.30
Velocity Components		
DYE (m/sec)	7060.72	1.13
DZE (m/sec)	-2464.97	1.14
DXE (m/sec)	137.08	1.88

The position and velocity components are in the earth-fixed plumbline coordinate system. For comparison purposes, orbital data (Table VI) were transformed from space-fixed to earth-fixed plumbline coordinates. The differences shown are all within the accuracy limits of the two methods used.

#### 4.0 (C) ACTUAL AND NOMINAL POWERED TRAJECTORY

##### 4.1 Powered Flight

Table II presents the actual and nominal times of events in sequential order. Actual and nominal trajectory dependent parameters pertaining to the S-I booster are presented at significant times in Table III. Included in Table III are actual and nominal values of maximum acceleration and velocity of the S-I booster. These values for the S-IV stage are as follows:

Event	Parameter	Actual	Nominal	Act-Nom
Maximum Acceleration	Range Time (sec)	630.00	630.24*	- 0.24
	Longitudinal Acceleration ( $m/sec^2$ )	22.99	22.95	0.04
Maximum Velocity	Range Time (sec)	630.40	630.24*	0.16
	Earth-Fixed Velocity ( $m/sec$ )	7480.30	7451.60	28.70

\*First motion time has been added for comparison purposes.

Actual and nominal altitude, range, and cross range (ZE, Figure 22) are shown in Figures 10 and 11 for the S-I and S-IV powered portions of flight, respectively. The actual altitude was lower than nominal during the S-I operation but by S-IV CO it was 6.50 km higher than nominal. The actual range was greater than nominal at S-I and S-IV CO. A relatively large cross deviation from nominal developed during flight. At OECO the deviation was 1.62 km to the left of nominal and by S-IV CO the deviation had increased to 21.29 km. This lateral deviation has been attributed primarily to thrust vector misalignments on both the S-I and S-IV stages. A detailed discussion of this can be found in Reference 5. Longitudinal acceleration for both S-I and S-IV operations are shown in Figure 12. The acceleration was slightly higher than nominal during the S-I powered portion of flight and slightly lower than nominal during the S-IV powered portion of flight.

The magnitude of the actual and nominal earth-fixed velocity vectors is shown in Figures 13 and 14 for the S-I and S-IV powered portion of flight, respectively. The velocity gain from the S-I stage was 31.23 m/sec higher than nominal. This was determined by comparing the actual velocity obtained by the S-I stage at OECO with nominal velocity at OECO. The S-IV stage had a total velocity gain below nominal. Comparing the actual velocity obtained by the S-IV stage at S-IV CO with the nominal velocity at S-IV CO, assuming a 226.8 kg P.U. bias, shows that the actual velocity was 27.00 m/sec greater than nominal, or that the total velocity gain by the S-IV stage was 4.23 m/sec below nominal. However, analysis of the propulsion system performance indicates that the additional 226.8 kg of propellant was utilized and simultaneous depletion of propellants occurred. Consuming this propellant residual, according to the nominal trajectory, should have resulted in an additional velocity gain of 55.5 m/sec. Thus the actual total velocity gain for S-IV operation was 59.73 m/sec less than nominal. Table IV compares significant trajectory dependent parameters at IECO, OECO, and S-IV CO. It should be noted that the nominal S-IV CO parameters in this table assume the unused P.U. bias of 226.8 kg. This is used for comparison since the predicted orbit was based on this assumption.

Mach number and dynamic pressure are shown in Figure 15. Included in the calculation of the actual parameters are measured rawinsonde meteorological data to an altitude of 29.75 km. Between 29.75 km and 47.0 km altitude, the measured meteorological data were merged with the 1959 ARDC Atmosphere. Above 47.0 km, the 1959 ARDC Atmosphere was used (see References 4 and 6).

All nominal powered trajectory data were taken from Reference 1.

#### 4.1.1 Thrust Decay

The velocity gains from the various thrust decay periods were as follows:

Velocity Gain (m/sec)

<u>Event</u>	<u>Actual</u>	<u>Nominal</u>
IECO	5.4	5.0
OECO	5.2	5.2
S-IV CO	1.9	1.3

The S-IV CO signal was given by LOX depletion, thus allowing cutoff signal to occur slightly after thrust decay had begun. As a consequence, the velocity gain shown here cannot be indicative of a normal decay from full thrust.

#### 4.1.2 Separation

A time history of the S-I/S-IV separation is shown in Figures 16 and 17. The physical separation of the two stages occurred when the resultant acceleration from thrust decay and retro-rockets of the S-I stage was less than the total acceleration from the ullage rockets of the S-IV stage. Telemetered longitudinal and normal acceleration data, in conjunction with telemetered attitude data, were used to obtain the relative acceleration between the two stages. This relative acceleration is determined by algebraically adding the resultant accelerations from the two stages after they have been transferred to a common coordinate system. The relative velocity and translation between the two stages were determined by integrating the relative acceleration.

Telemetered normal acceleration data from the S-I stage were not available; hence, the resultant acceleration from the S-I stage is comprised entirely of longitudinal data. The effects of the normal acceleration could, however, be significant. Attitude information from the S-IV stage during the separation process was not available because of the ullage and retro-rocket operations. The attitude was essentially normal when the telemetry signal was reacquired, so it can be assumed that no significant S-IV attitude changes occurred during this period. Thus, during the separation phase, the majority of the angular motion can be attributed to the uncontrolled S-I stage.

To compare actual and nominal longitudinal translation, the times of the nominal data were adjusted by the difference in time of actual and nominal physical separation. The nominal S-I/S-IV separation data was obtained from Reference 9.

Separation signal was given at 147.14 sec range time, and physical separation occurred at approximately 147.34 sec range time. The S-IV engine nozzles were above the S-I separation plane by 148.17 sec range time. This was 0.14 sec earlier than nominal.

Reference 7 indicates that it is desirable for the S-IV engine nozzles to clear the separation plane by 3.048 m (10 ft) at the time of S-IV stage ignition. At this time the distance from the S-IV engine nozzles to the separation plane was approximately 8.4 m.

#### 4.2 S-I Booster Trajectory After Separation

A theoretical free flight trajectory of the discarded S-I booster was generated using position and velocity data from the 0.18 radar at 250 sec. Reliable tracking was lost at approximately 367 sec. At this time the theoretical trajectory deviated from the 0.18 radar data by less than 20 m. Also included as input to the theoretical free flight trajectory were 1959 ARDC atmospheric data and nominal drag coefficient data reflecting a tumbling condition of the booster.

Analysis of the booster motion from telemetry indicates that it was describing a slow precessional motion up to re-entry. The half cone angle of this precessional motion about a changing angular momentum vector was 85 deg at re-entry (439 sec). Subsequent to this, the motion of the booster rapidly became more erratic. Telemetry from the booster was lost at approximately 476.7 sec. Because of this erratic angular motion two additional drag conditions were considered. Nominal coefficients of drag were used assuming the booster (1) stabilized at an angle of attack of  $90^{\circ}$  and (2) stabilized at an angle of attack of  $0^{\circ}$ . The following table shows the results of the three cases.

Drag Condition	Impact Range (km)	Impact Time (sec)
$0^{\circ}$ Angle of Attack	922.62	566.71
Tumbling	913.07	626.03
$90^{\circ}$ Angle of Attack	908.14	677.12

The theoretical free flight trajectory utilizing the tumbling drag coefficient data will be considered as the actual free flight trajectory of the booster. The impact location relative to the launch site is shown in Figure 18 and the free flight trajectory is presented in Table V.

Preliminary impact information was also obtained from RCA, Cape Kennedy. The table following presents booster impact position from RCA Preliminary IP Report, actual free flight trajectory, and nominal free flight trajectory. Actual surface range is greater than nominal surface range because the actual velocity and altitude of the booster at OECO was higher than nominal.

Parameter	Booster Impact			
	Preliminary IP Report	Actual	Nominal	Act-Nom
*Surface Range (km)	910.260	913.070	895.150	17.920
Cross Range (km)	-	4.947	18.000	-13.053
Geodetic Latitude (deg)	26.080	26.070	26.012	0.058
Longitude (deg)	71.785	71.755	71.972	-0.217
Range Time (sec)	630.960	626.030	630.010	-3.980

\*Surface Range is measured from launch site.

The difference between the Preliminary IP Report impact and the actual impact can probably be attributed to the manner in which the 0.18 radar data were used to establish the initial conditions for the ballistic trajectory.

To establish the actual free flight trajectory, the 0.18 radar data were numerically smoothed using least square coefficients (see Figure 8 for frequency response of coefficients). The smoothed velocities were then manually plotted to remove low frequency oscillations. The preliminary IP free flight trajectory was established utilizing 0.18 radar data from 150 sec to 200 sec. Since the quality of the 0.18 radar data was not good around 150 to 160 sec, it is

believed that the use of the data at those times would not give an accurate solution. Another possible cause of the differences could be in the particular drag coefficient data that were used in each case.

Information from Cape Kennedy indicates that the camera capsule impact range was approximately 918 km. A survey of the recovery area indicated that the capsules were within an approximately circular area with 2.8 km radius.

## 5.0 (U) ORBITAL FLIGHT

### 5.1 Orbit Analysis

The S-IV-5 stage with instrument unit and Jupiter nose cone was inserted into orbit on January 29, 1964 at 16:35:40.97 universal time (U. T.): insertion time is defined as 10 sec after S-IV CO, 639.97 sec range time, in order to insure that there are no effects due to thrust decay. The orbital insertion conditions for SA-5 were determined by a differential correction procedure using Antigua (91.18, FPQ-6) beacon-track radar data and the first two passes of Johannesburg, South Africa, Minitrack data. Forty radar observation time points were used from the period immediately after orbital insertion (640-658 sec and 734-758 sec range time). There were no radar data available between 658 and 734 sec range time. The number of Minitrack direction cosine data time points utilized numbered 55 from the first pass (17:01:45 U. T. to 17:02:12 U. T.) and 50 from the second pass (18:42:37 U. T. to 18:43:09 U. T.).

The classical osculating two body orbital elements and the corresponding space-fixed position and velocity vector at orbital insertion are shown in Table VI. The orbital elements are referenced to the apparent equinox and equator at zero hours U. T. the day of launch. The following tables show a comparison between some actual and nominal orbital insertion parameters.

#### Insertion Conditions

	Actual	Nominal	Act-Nom
Time of Orbital Insertion after Lift Off (sec)	639.56	639.94	-0.38
Space-Fixed Velocity (m/sec)	7889.9	7861.4	28.5
Pitch Angle (deg)	89.74	90.03	-0.29
Altitude (km)	262.38	255.90	6.48

### Orbital Parameters

	Actual	Nominal	Act- Nom
Apogee Altitude (km)	771.43	642.21	129.22
Perigee Altitude (km)	262.28	258.16	4.12
Period (min)	94.86	93.48	1.38
Inclination (deg)	31.46	31.57	-0.11
Excess Circular Velocity (m/sec)	140.60	108.30	32.30
Nominal Lifetime (days)	451	286	165

At orbital insertion the vehicle was 19.1 km further down range, 22.3 km to the left and 6.5 km higher than nominal. The increase in apogee and perigee altitudes of 129.2 km and 4.1 km respectively from the nominal resulted in a postflight predicted lifetime of 451 days, which is 165 days longer than nominal.

Figures 19 and 20 are plots of the radar and Minitrack error residuals based on an orbit defined by the insertion conditions above. The time shown in the graphs is referenced to zero hours U.T. of the day of launch. The RMS error of the radar residuals is 2.5 m in range and 0.006 deg in angles. The average RMS error for both passes of Minitrack direction cosine residuals is 55 ppm (parts per million). These errors compare to the design system accuracies for the radar of 2.7 m in range and 0.003 deg in angles, and the accuracy from prior experience for the Minitrack direction cosines of 68 ppm.

Propellant venting occurred after S-IV CO. An attempt was made to minimize the effect of the unknown venting disturbances on the orbit determination by differentially correcting not only for position and velocity, but also for atmospheric drag. The drag solution partially compensates for the effects of venting on the orbit. The results of the solution were an effective force of 10 times the nominal drag force, and acting in the opposite direction to the drag. An initial velocity was obtained within 0.2 m/sec and a position within 100 m of the correction obtained without the drag solution. The observed effective force cannot represent true atmospheric drag and the solution

obtained is believed to reflect the disturbing forces of propellant venting. The tracking data residuals after the pseudo-drag solution were a factor of two less than without a drag solution.

Insertion condition solutions were made using only Antigua radar data or Minitrack data and combinations of both data sources, with and without solving for effective drag. The maximum deviation between the solutions was 0.5 m/sec in any velocity component and 100 m in any position component for all cases considered. It is considered that these deviations in position and velocity are an indication of the accuracy of the quoted insertion conditions.

## 5.2 Orbital Tracking Performance

Orbital tracking of SA-5 is being conducted by the NASA Space Tracking and Data Acquisition Network (STADAN), which is composed of the global network of Minitrack stations, and the Manned Space Flight Network (MSFN), supported by elements of the Department of Defense, which is a global network of radar tracking stations. Additional tracking support is provided by the optical tracking network of the Smithsonian Astrophysical Observatory (SAO).

Figure 21 is a bar graph showing the stations in the MSFN which have successfully performed radar skin-track and their time span of tracking from the date of vehicle insertion, January 29, 1964, through February 21, 1964. Through this date only four stations were successful in skin tracking. These stations were White Sands, New Mexico; Eglin AFB, Florida; Carnarvon, Australia; and Antigua. They are the more powerful radars in the MSFN net, Eglin and White Sands being extended range FPS-16's, and Carnarvon and Antigua even more powerful FPQ-6's. It can be seen on the graph that except for initial tracking by White Sands, attempts at skin-track were unsuccessful during the first week of orbital flight. The only station to skin-track successfully the second week of orbital flight was Eglin, which averaged approximately  $1\frac{1}{2}$  min of data per acquisition. During the third and fourth weeks, the Antigua and Carnarvon radars were successful in acquiring. The Antigua radar achieved one maximum tracking span of over 9 min, and the Carnarvon radar achieved one maximum tracking span of over 5 min. It can be seen that there was a continuing increase in the number of acquisitions and lengths of track. This can be attributed in part to improved acquisition techniques and proficiency by the radar operators.

During the lifetime of the minitrack beacon the orbiting vehicle was tracked daily by STADAN. There were 26 passes of minitrack direction cosine observations during the first two days of orbit. After this time, approximately 12 passes of minitrack direction cosines per day were received. The lifetime of the minitrack beacon was 66 days as compared to the nominal lifetime of 50 days. The last reported minitrack tracking was by Santiago, Chile at 15:49 U. T. on April 3, 1964.

Through February 10, 1964, 56 optical observations (Baker-Nunn camera and moon watch) were reported by SAO. Reported stellar magnitudes of the orbiting vehicle varied from +3 to +1.

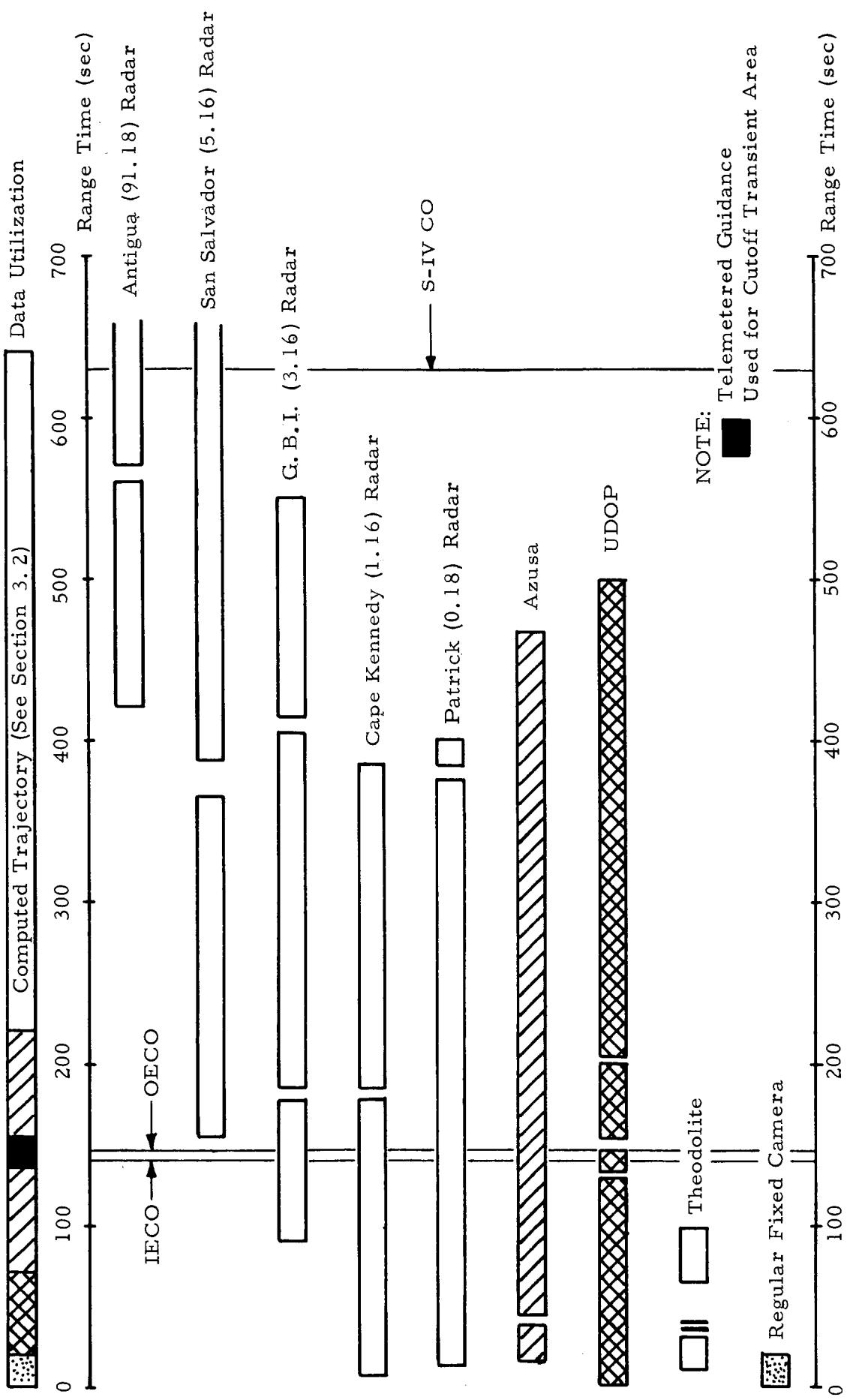


FIGURE I AVAILABLE FINAL TRACKING DATA

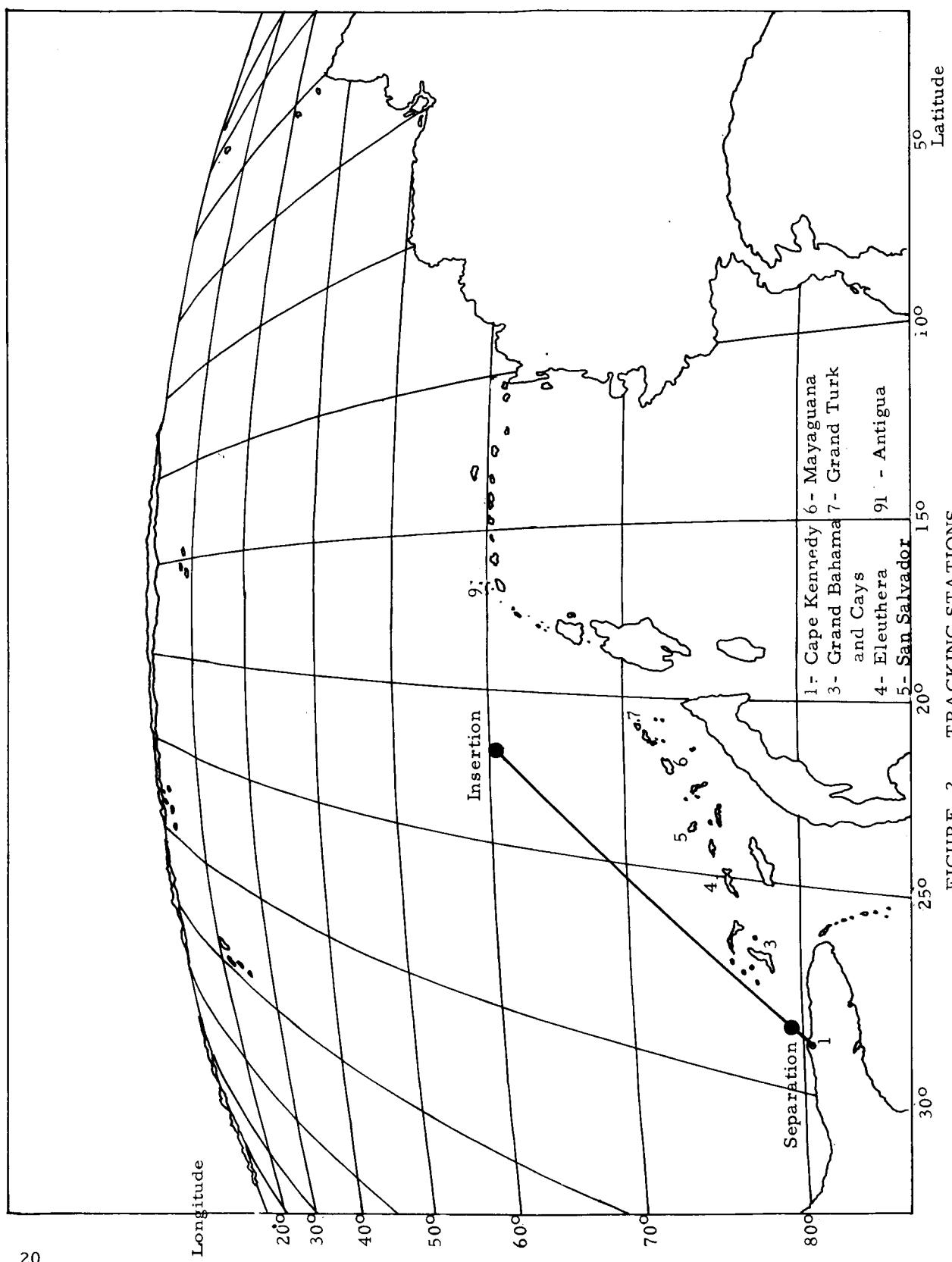


FIGURE 2 TRACKING STATIONS

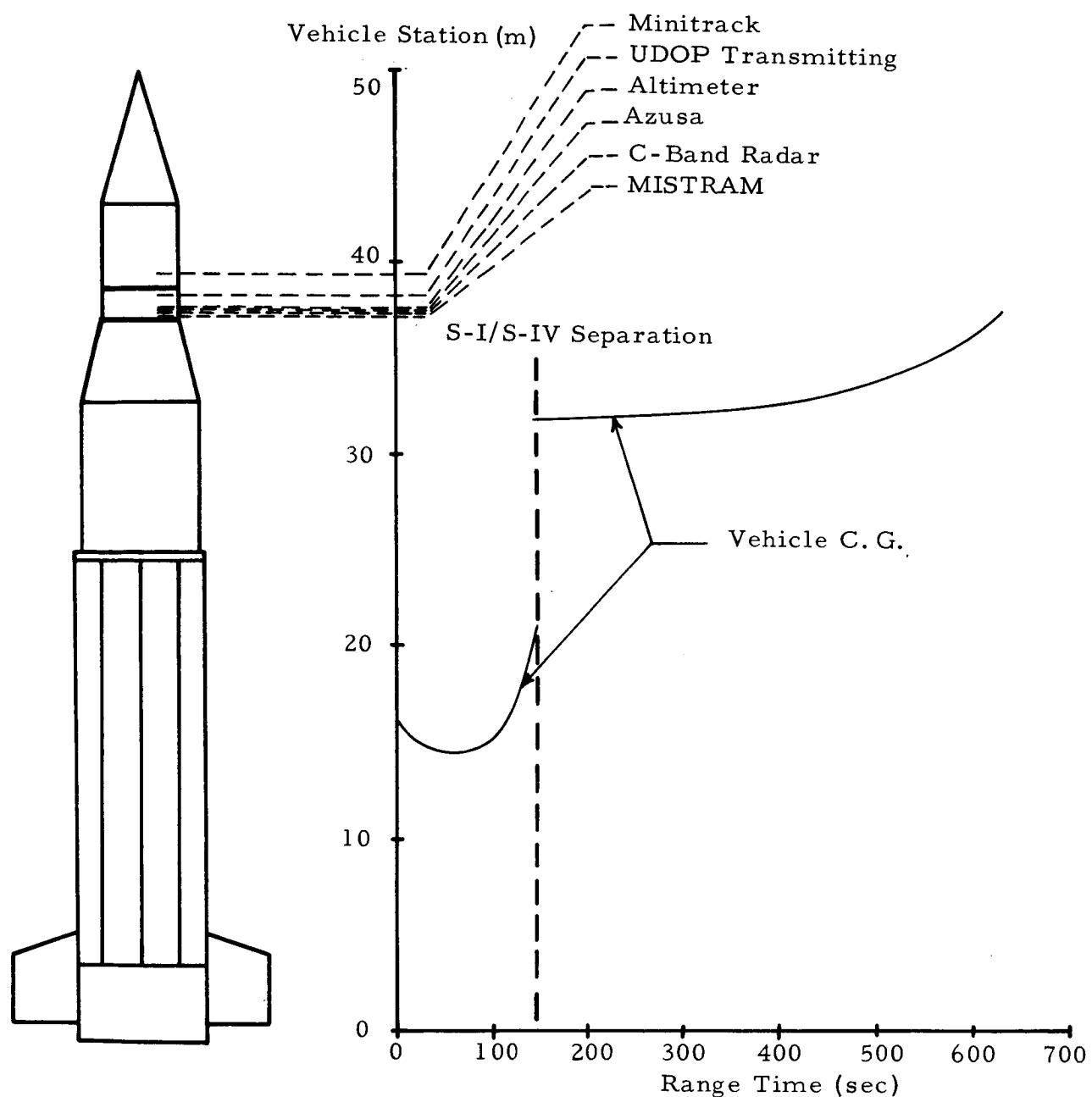


FIGURE 3 ANTENNA LOCATIONS AND VEHICLE CENTER OF GRAVITY VERSUS RANGE TIME

$\Delta$  Altitude (Altimeter Minus Reference Trajectory) (m)

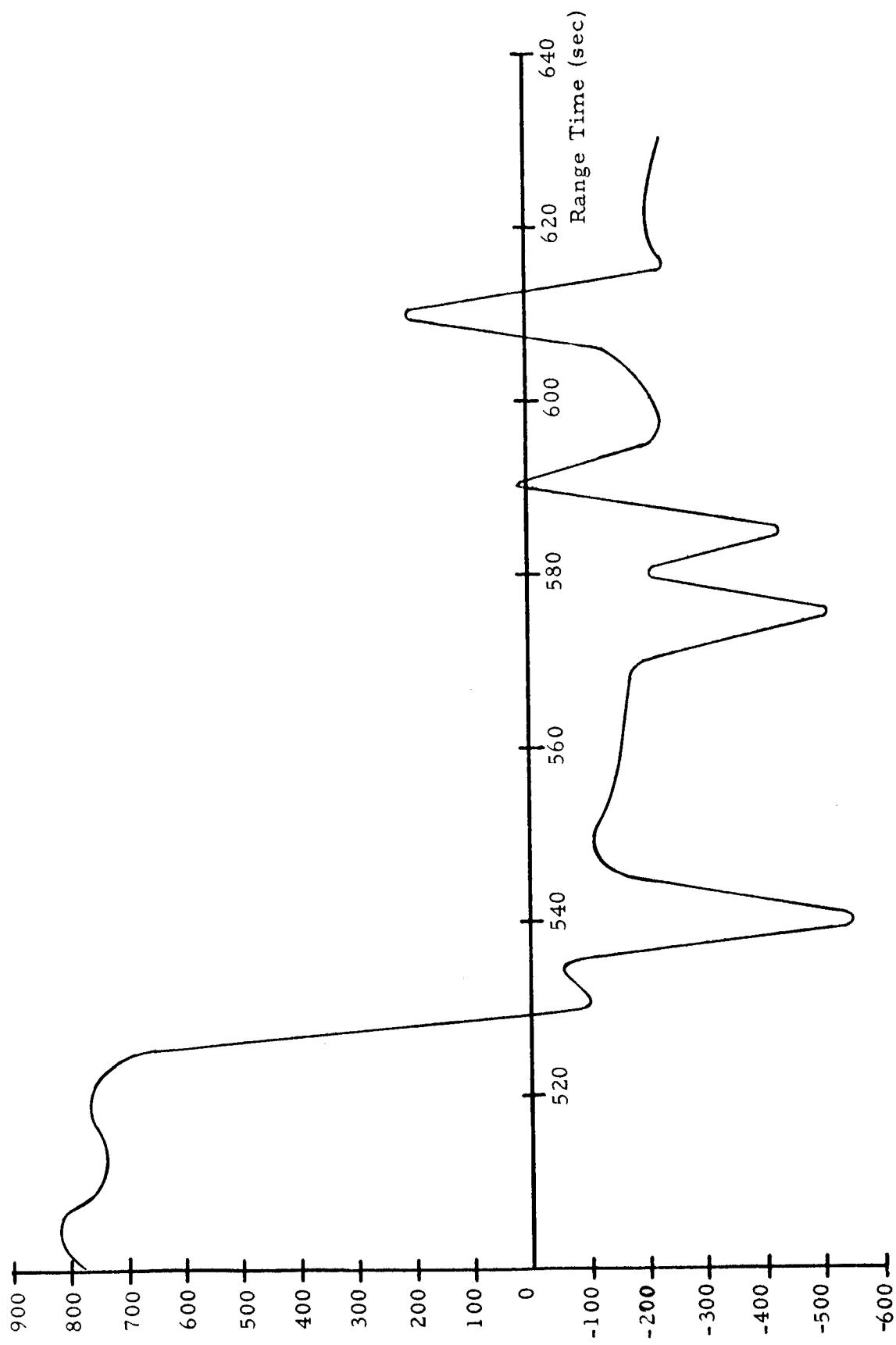


FIGURE 4 ALTITUDE COMPARISON

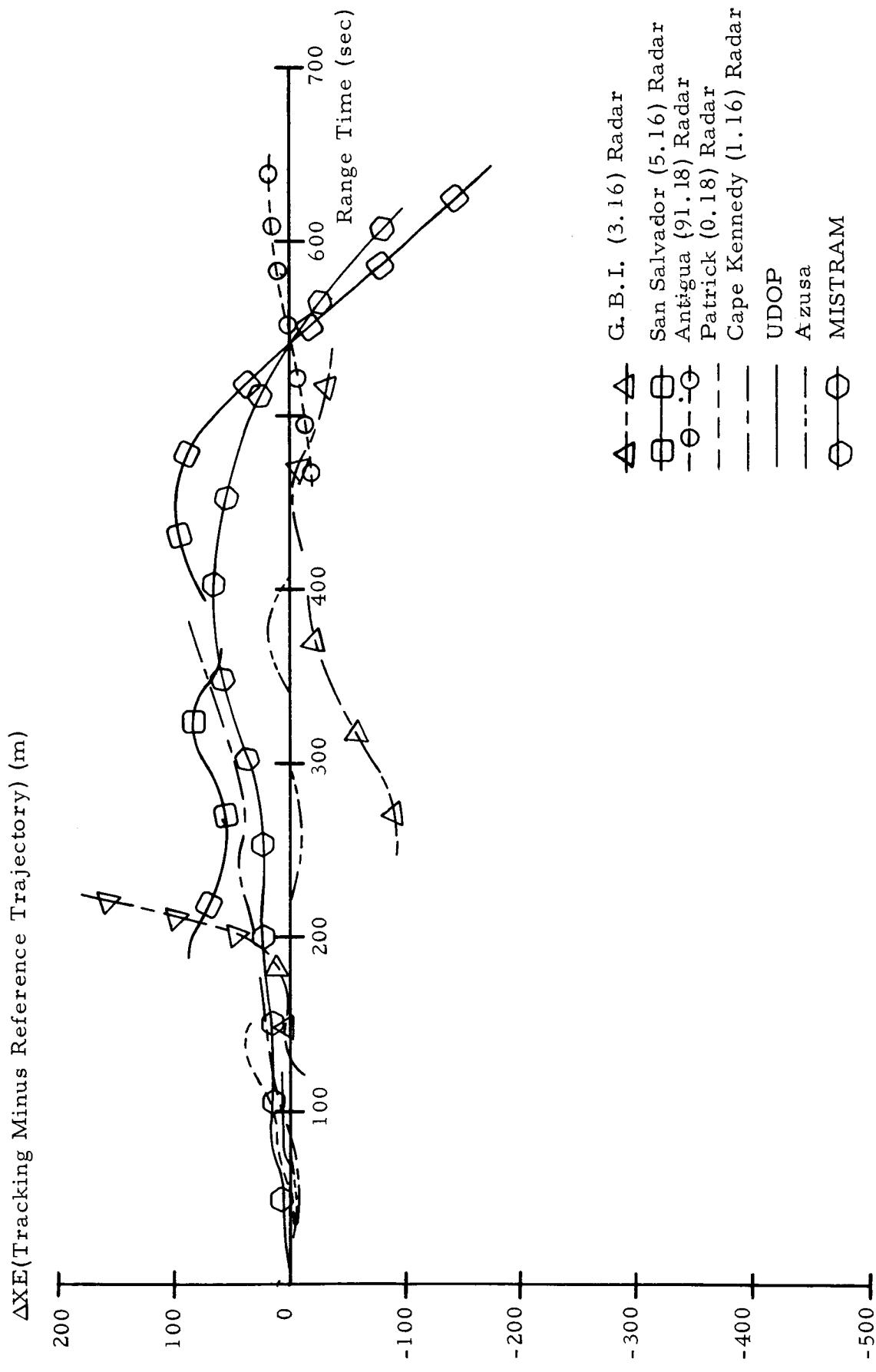


FIGURE 5 TRACKING COMPARISONS (POWERED FLIGHT)

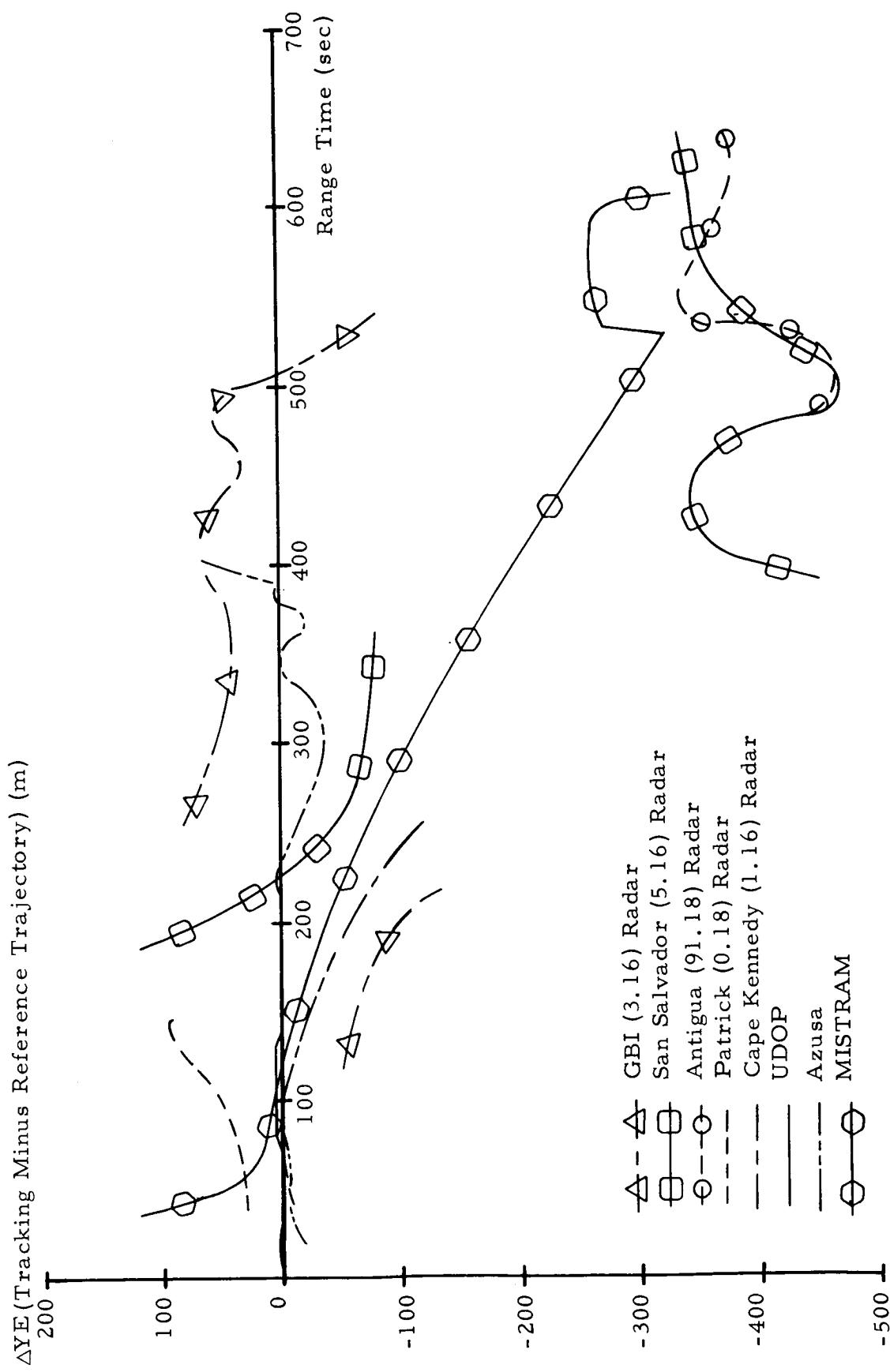


FIGURE 6 TRACKING COMPARISONS (POWERED FLIGHT)

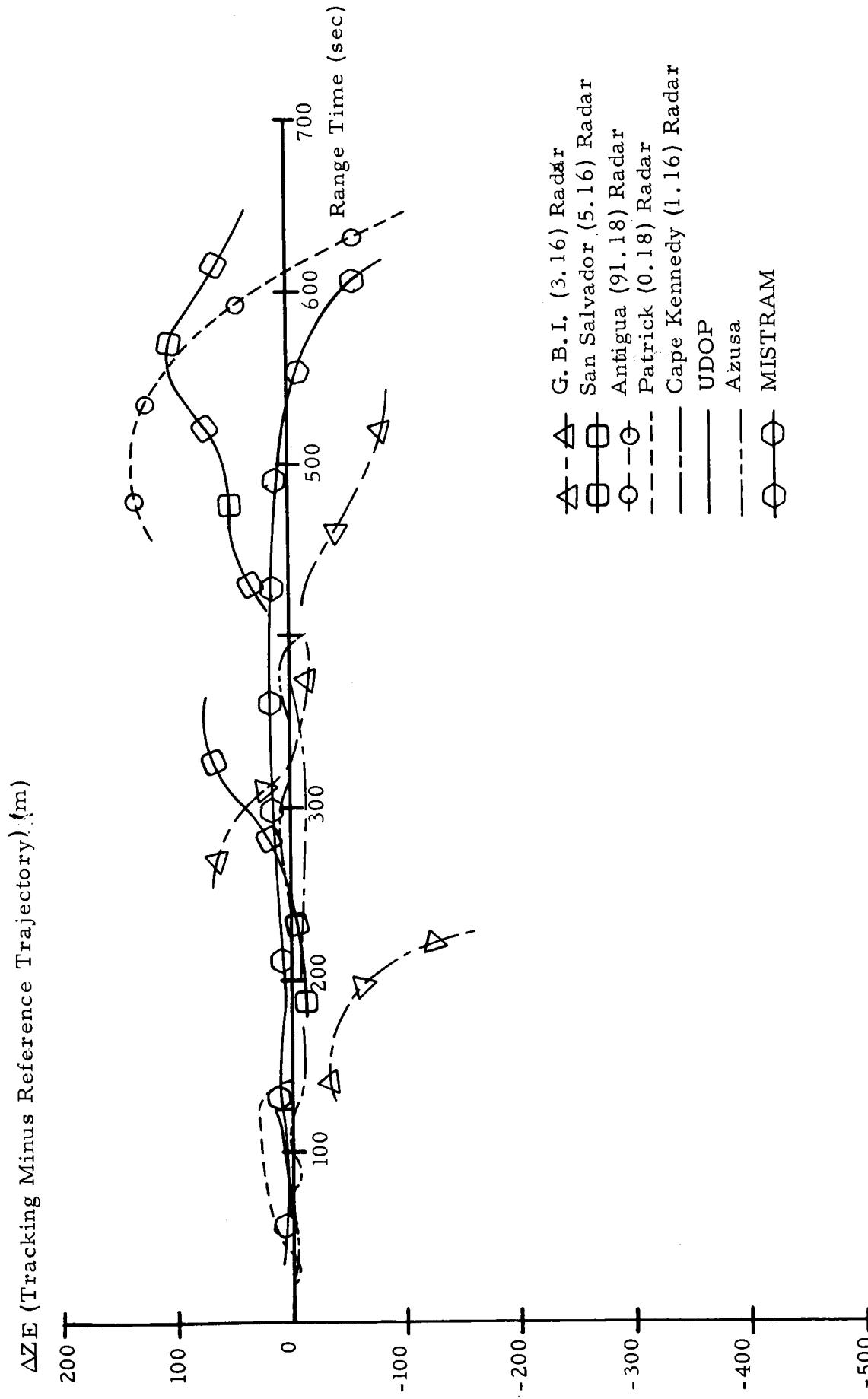


FIGURE 7 TRACKING COMPARISONS (POWERED FLIGHT)

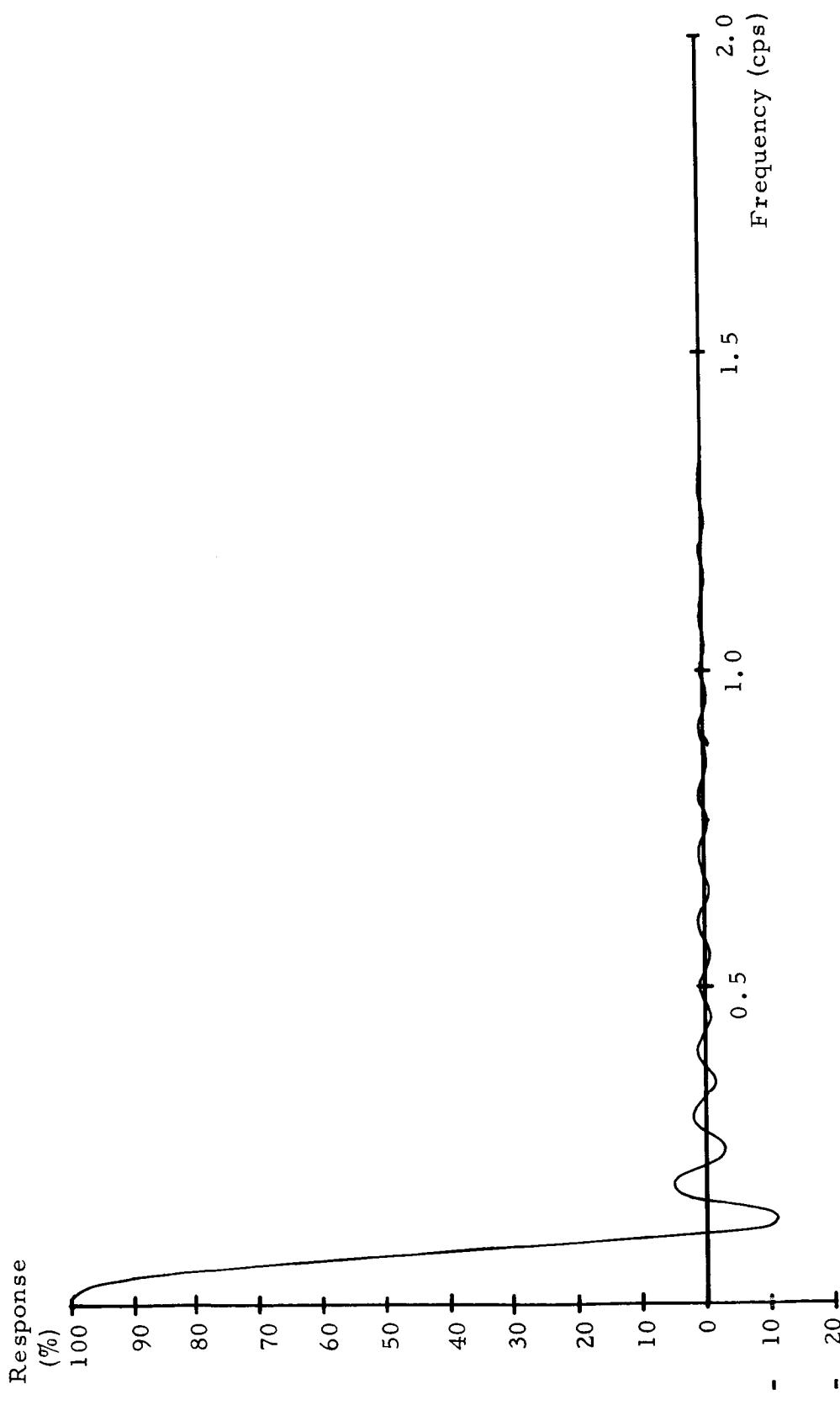


FIGURE 8 FREQUENCY RESPONSE OF SMOOTHING COEFFICIENTS

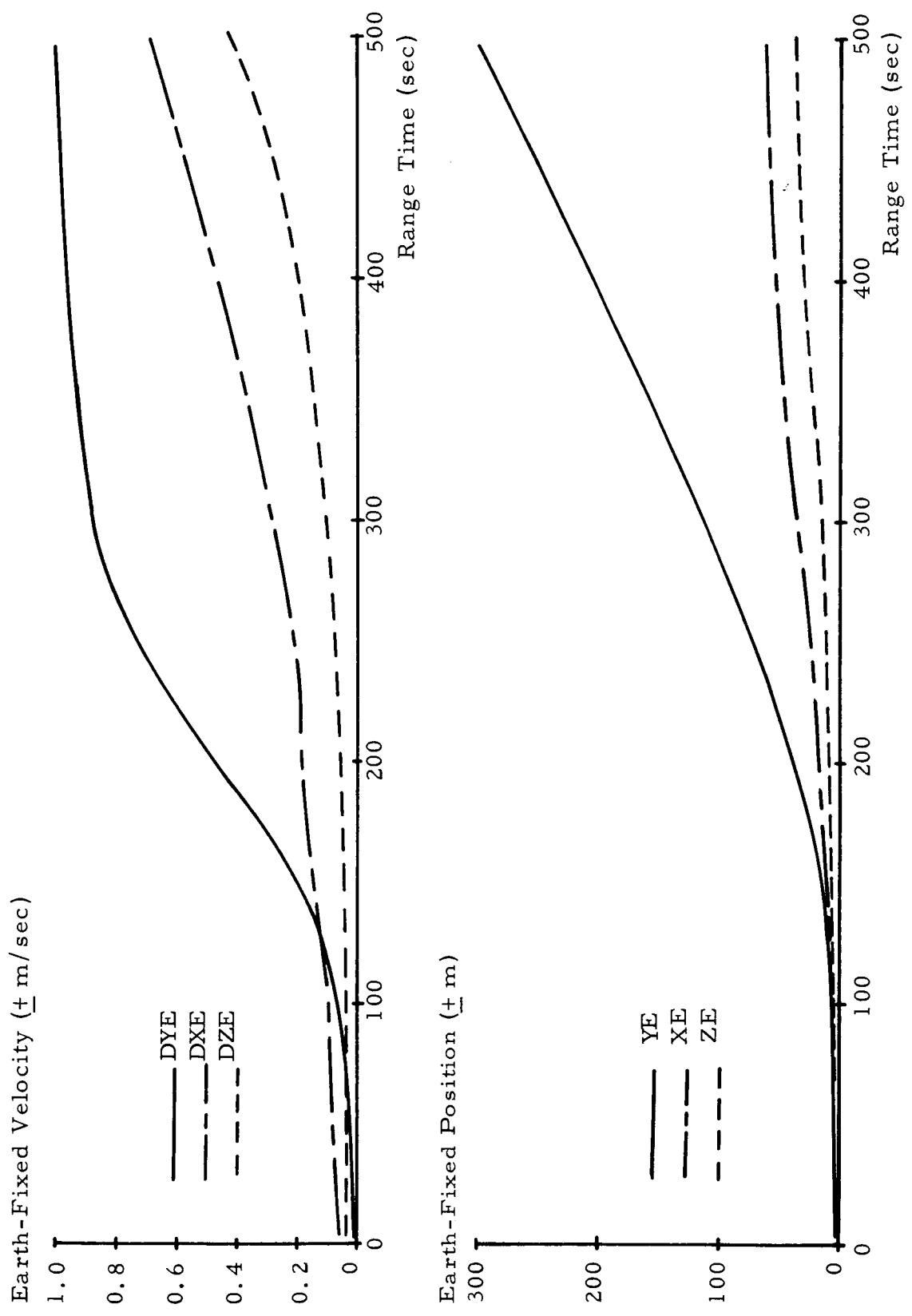


FIGURE 9 ESTIMATED UNCERTAINTY OF REFERENCE TRAJECTORY

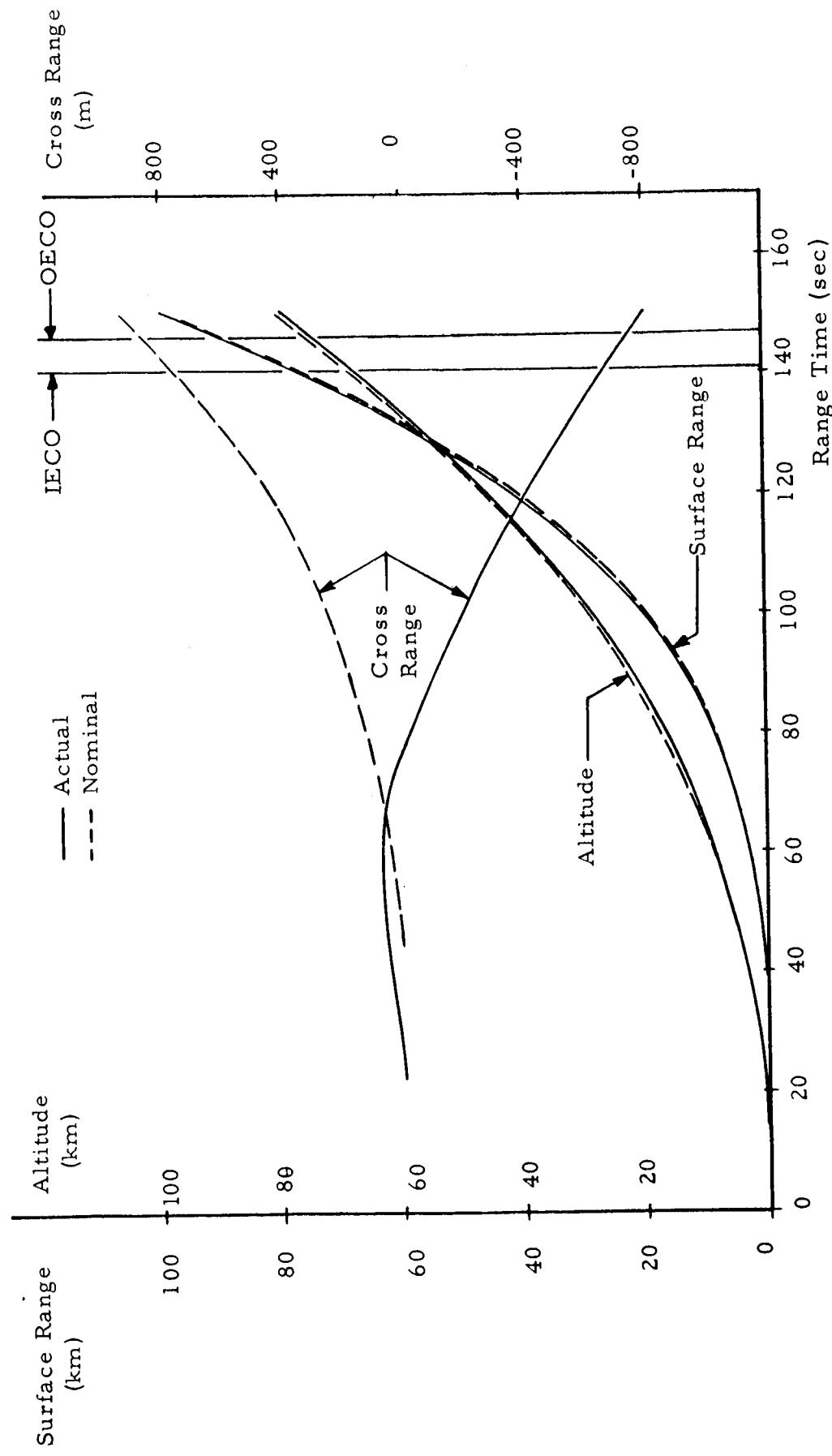


FIGURE 10 S-I TRAJECTORY

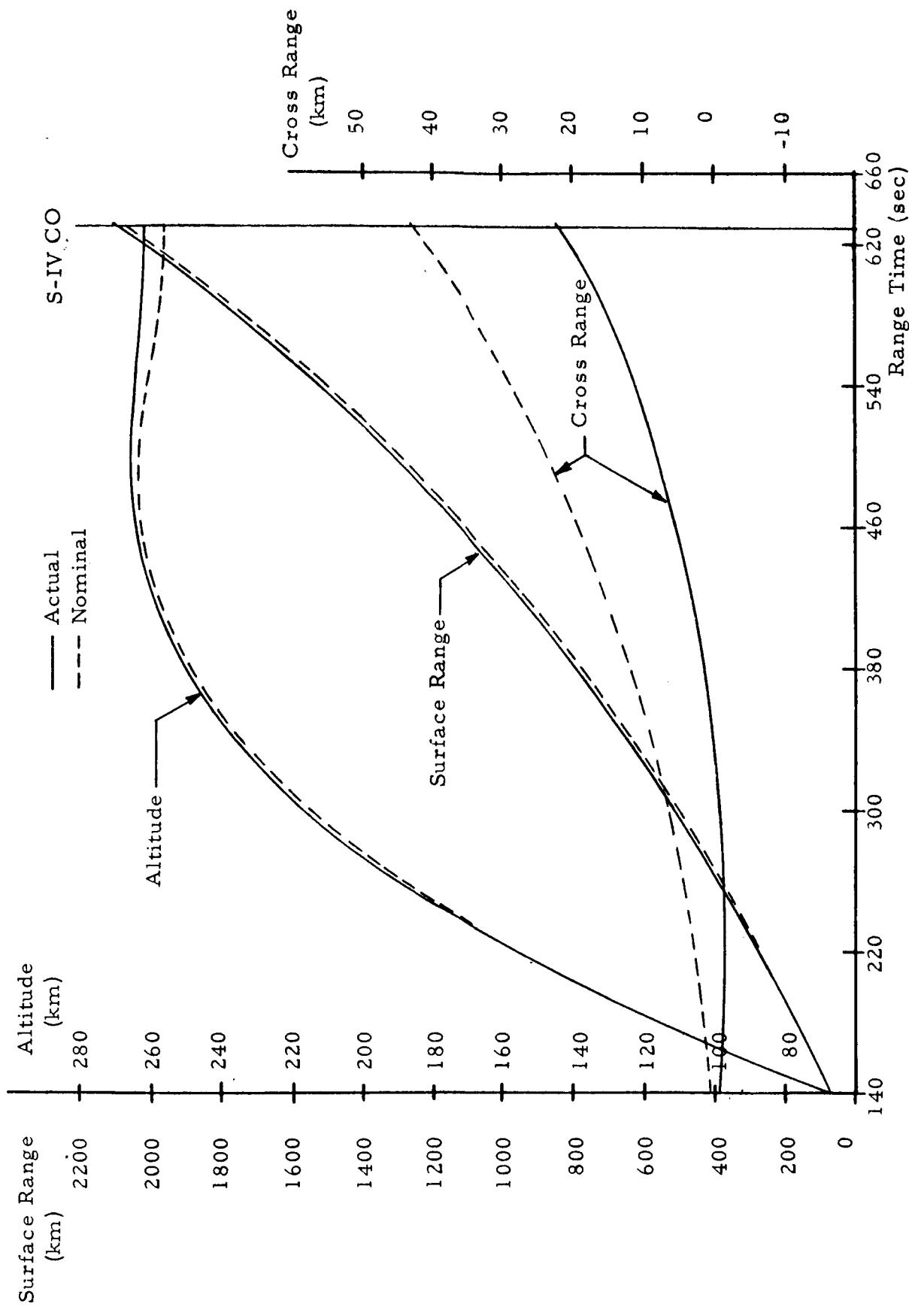


FIGURE 11 S-IV TRAJECTORY

~~CONFIDENTIAL~~

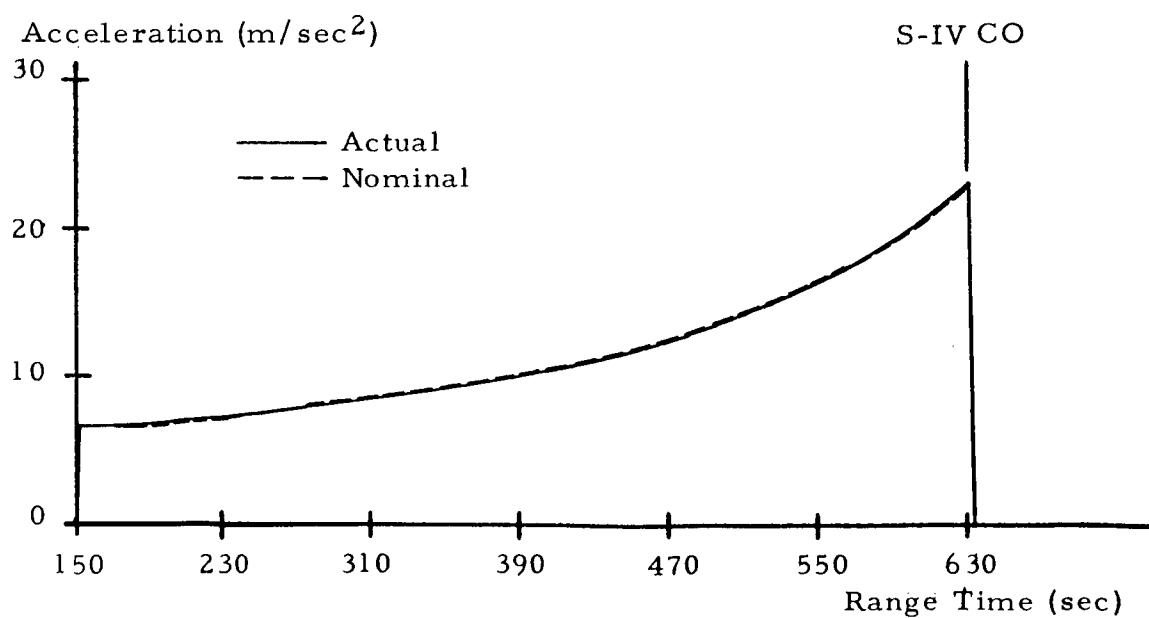
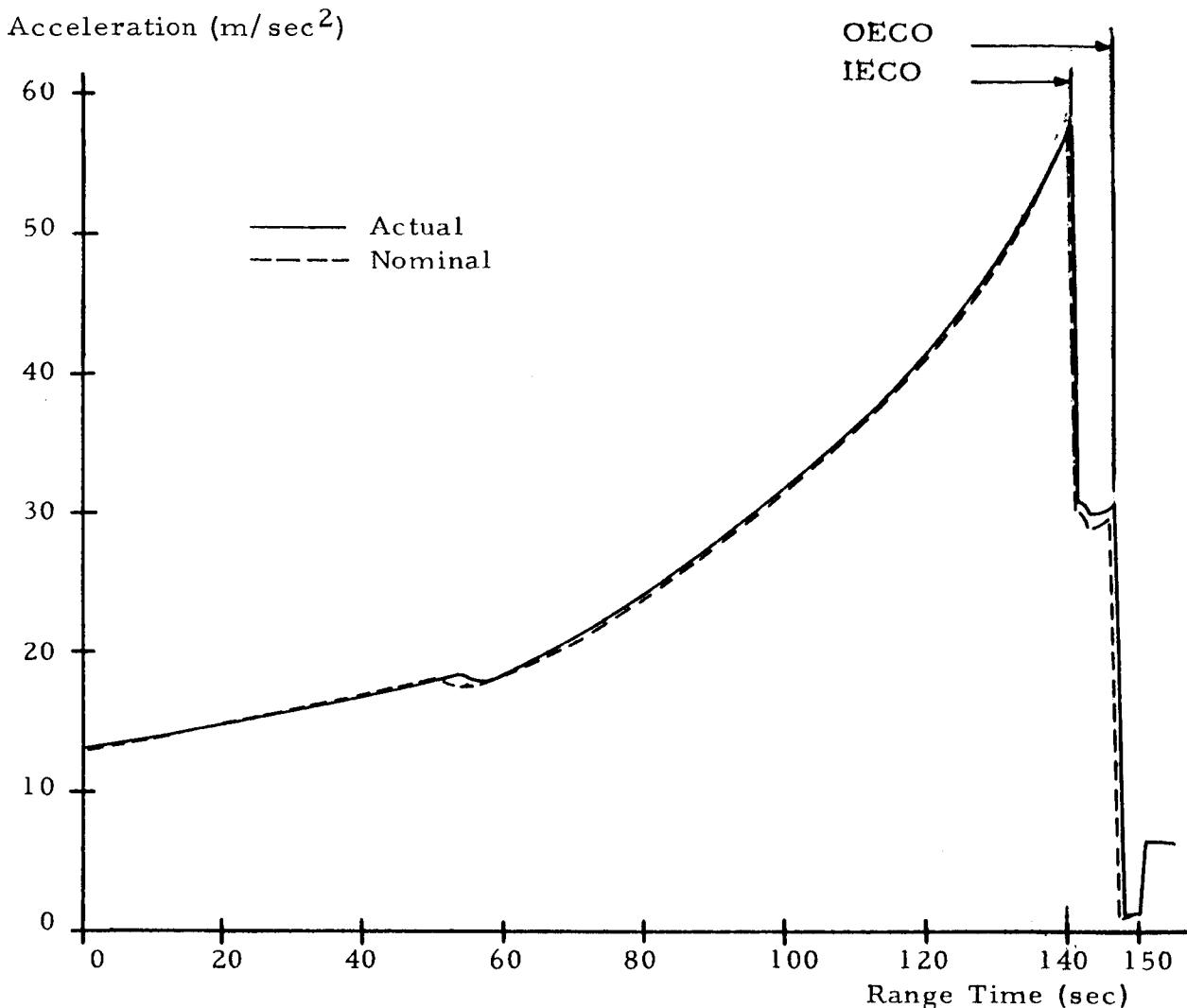


FIGURE 12 LONGITUDINAL ACCELERATION

~~CONFIDENTIAL~~

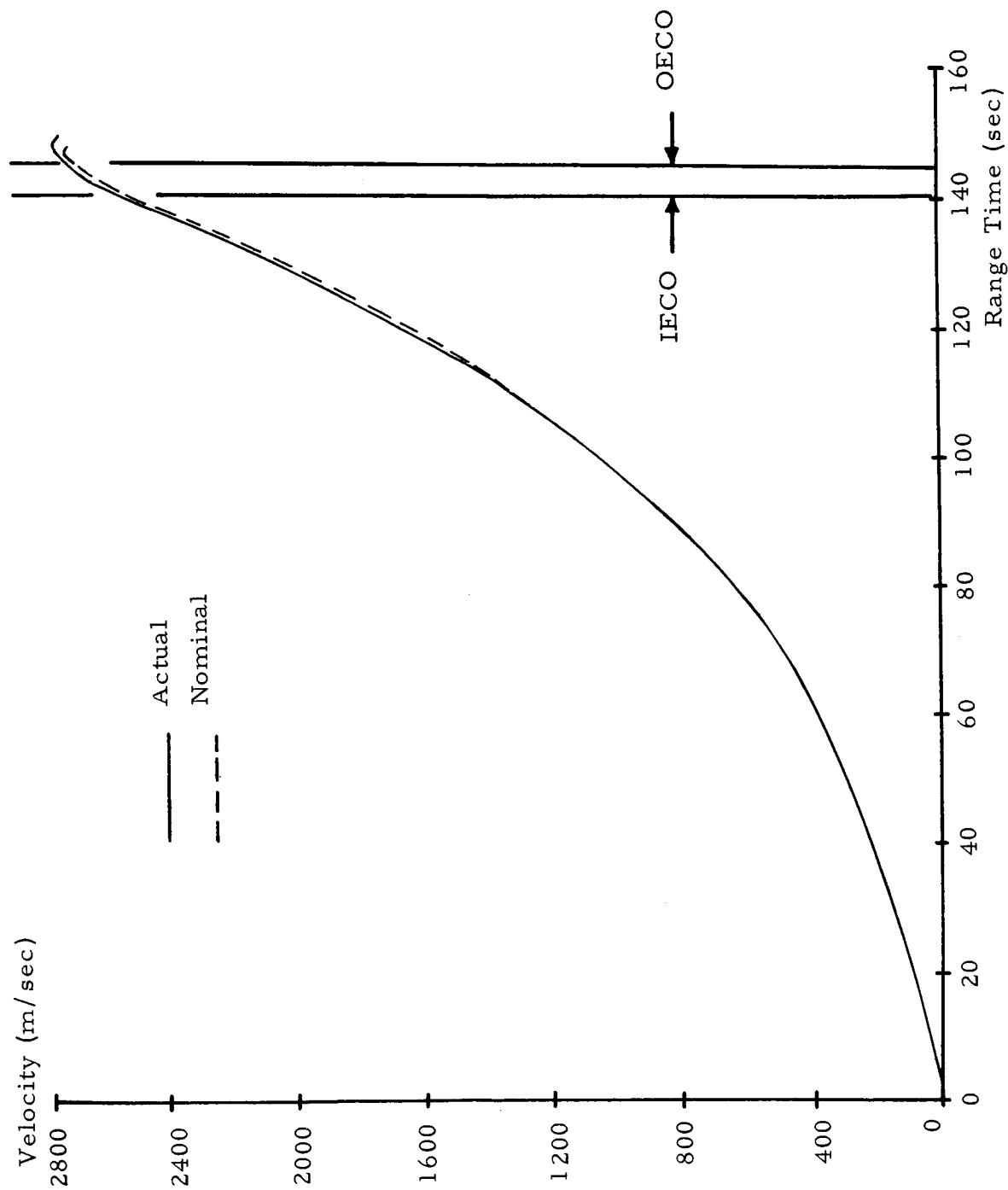


FIGURE 13 EARTH-FIXED VELOCITY

~~CONFIDENTIAL~~

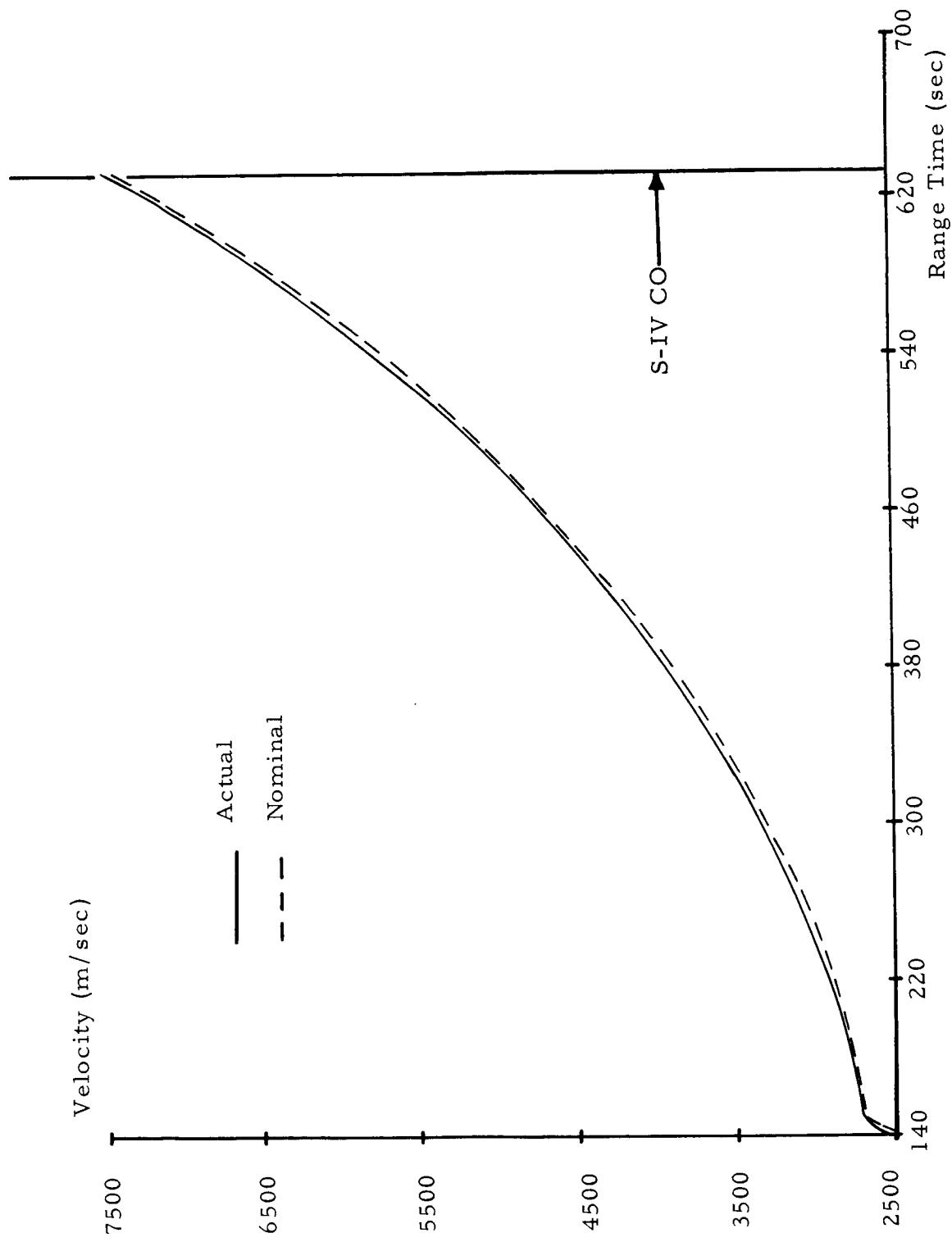


FIGURE 14 EARTH-FIXED VELOCITY

~~CONFIDENTIAL~~

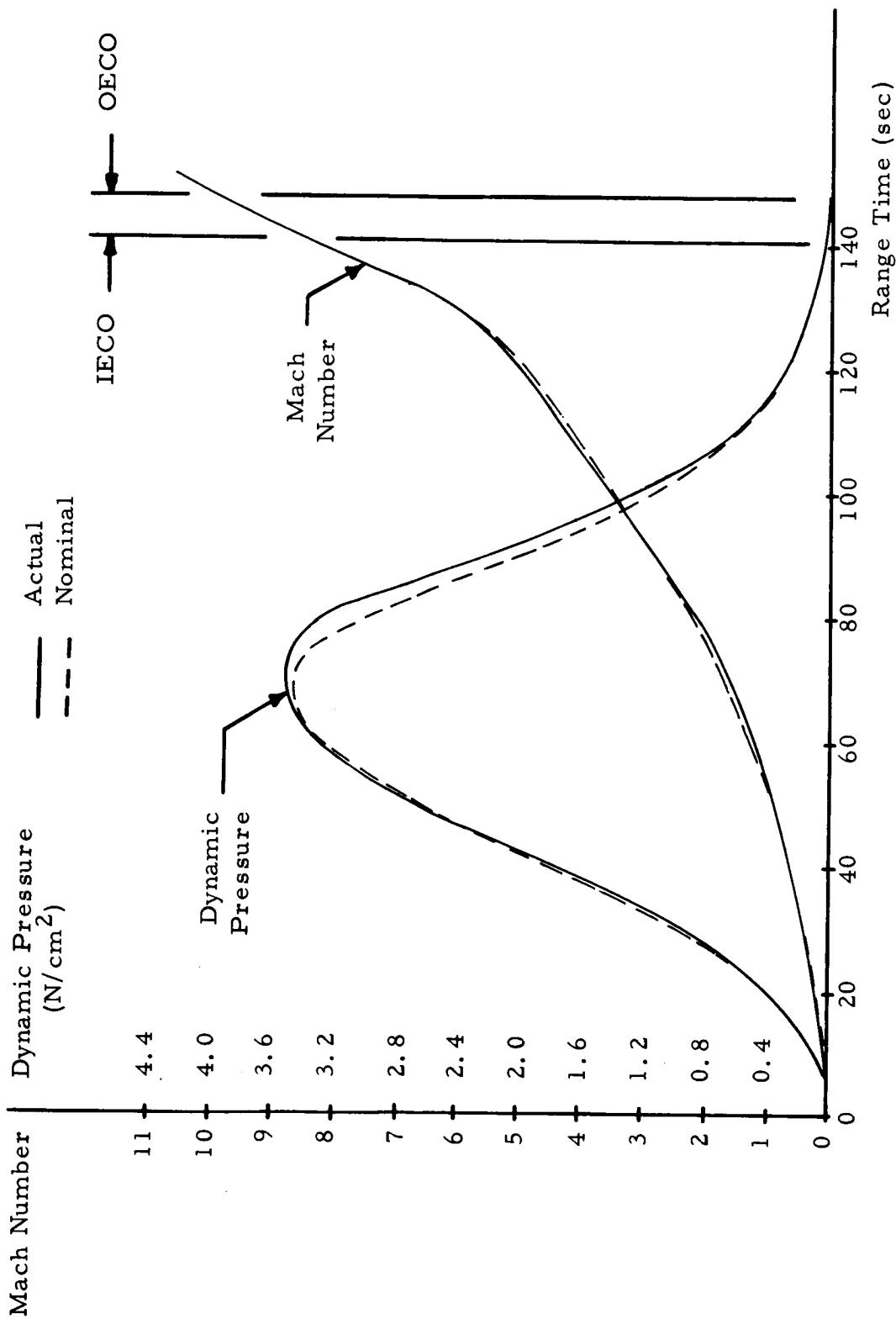


FIGURE 15 MACH AND DYNAMIC PRESSURE

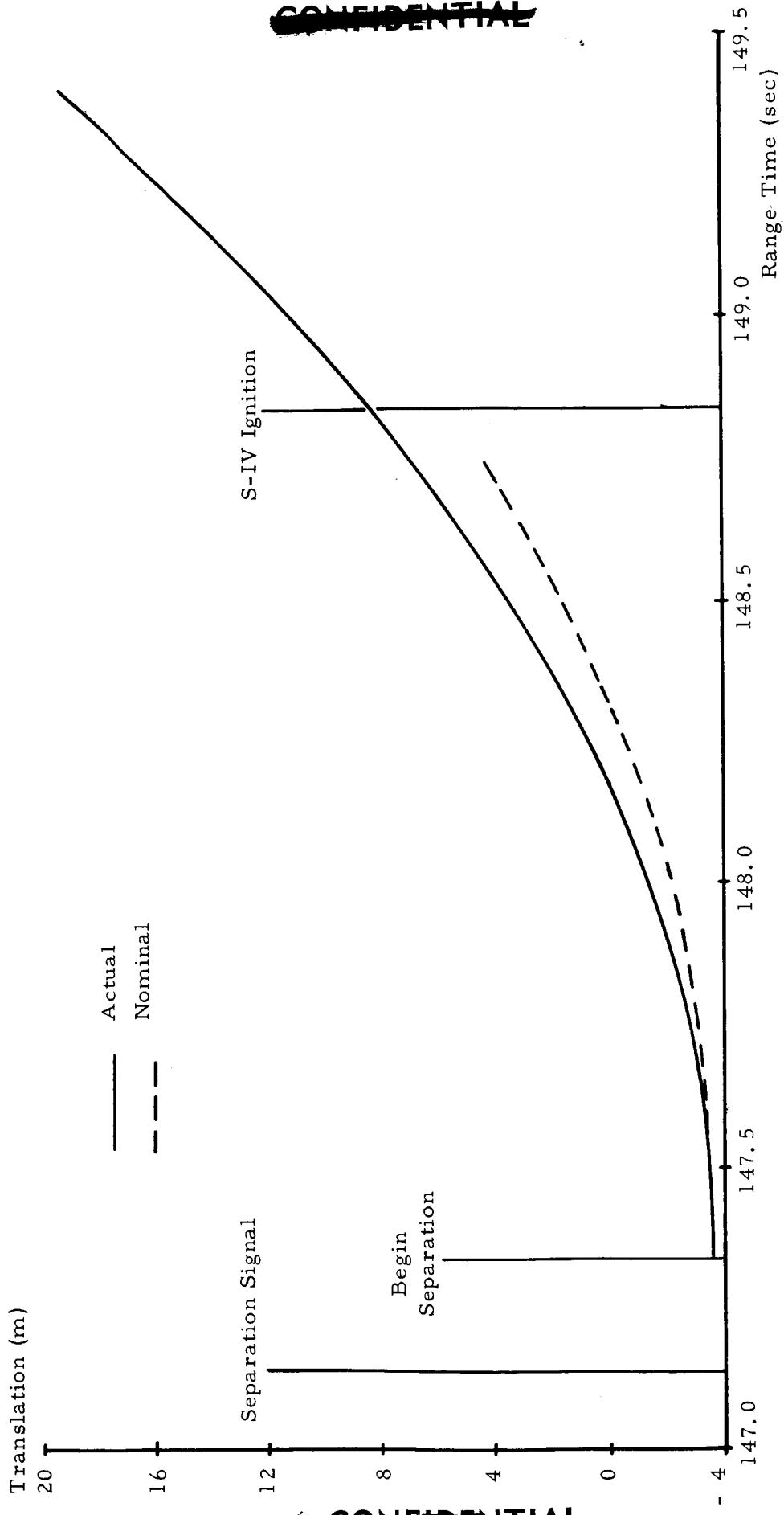


FIGURE 16 RELATIVE S-I/S-IV LONGITUDINAL TRANSLATION DISTANCE

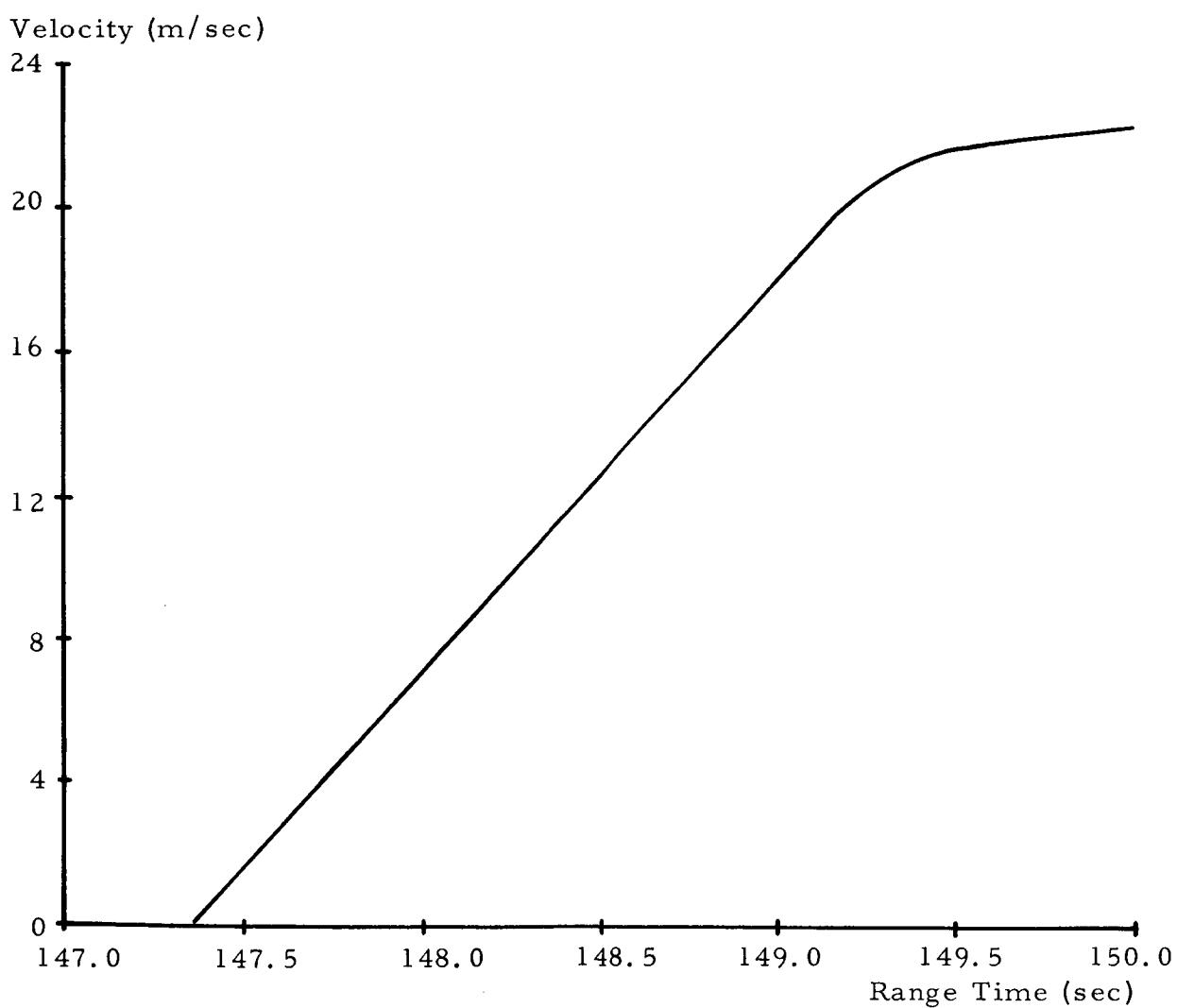
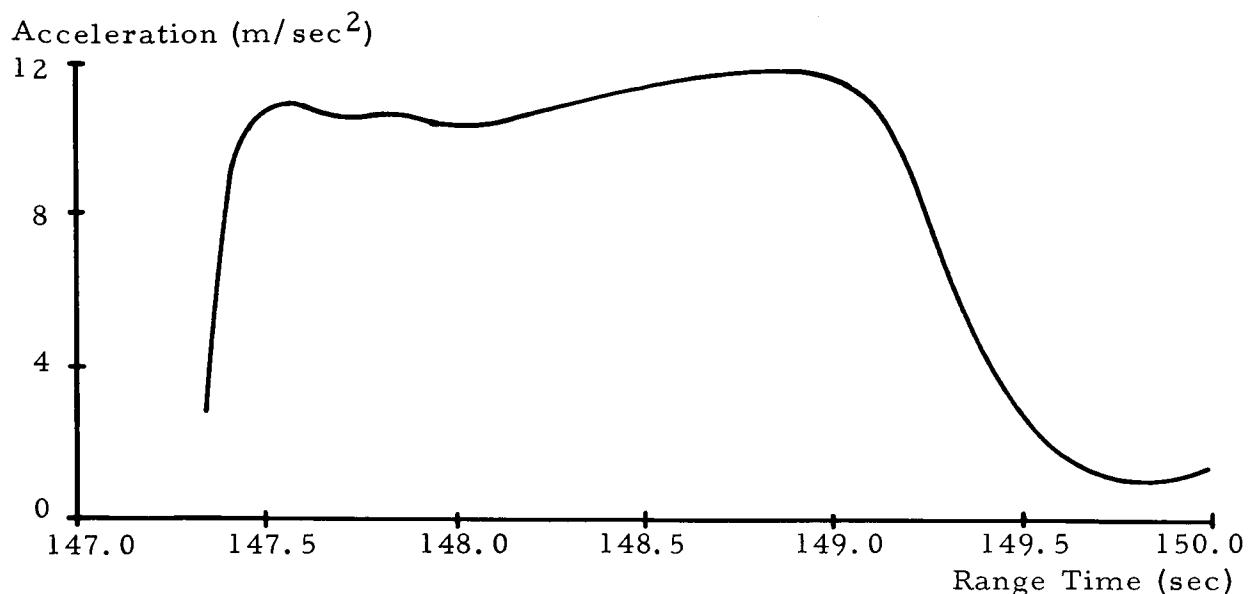


FIGURE 17 RELATIVE S-I/S-IV LONGITUDINAL ACCELERATION AND VELOCITY AFTER SEPARATION

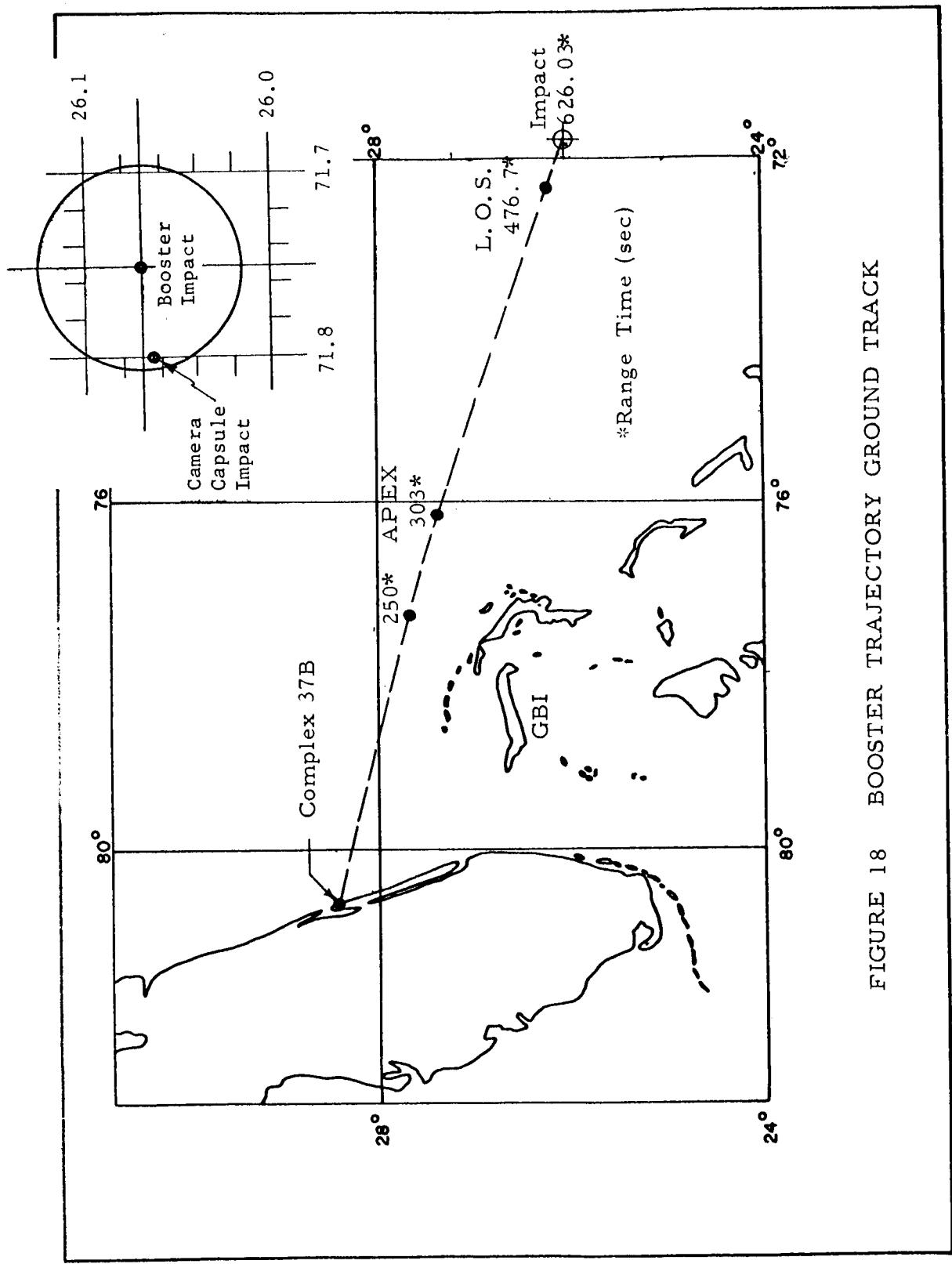


FIGURE 18 BOOSTER TRAJECTORY GROUND TRACK

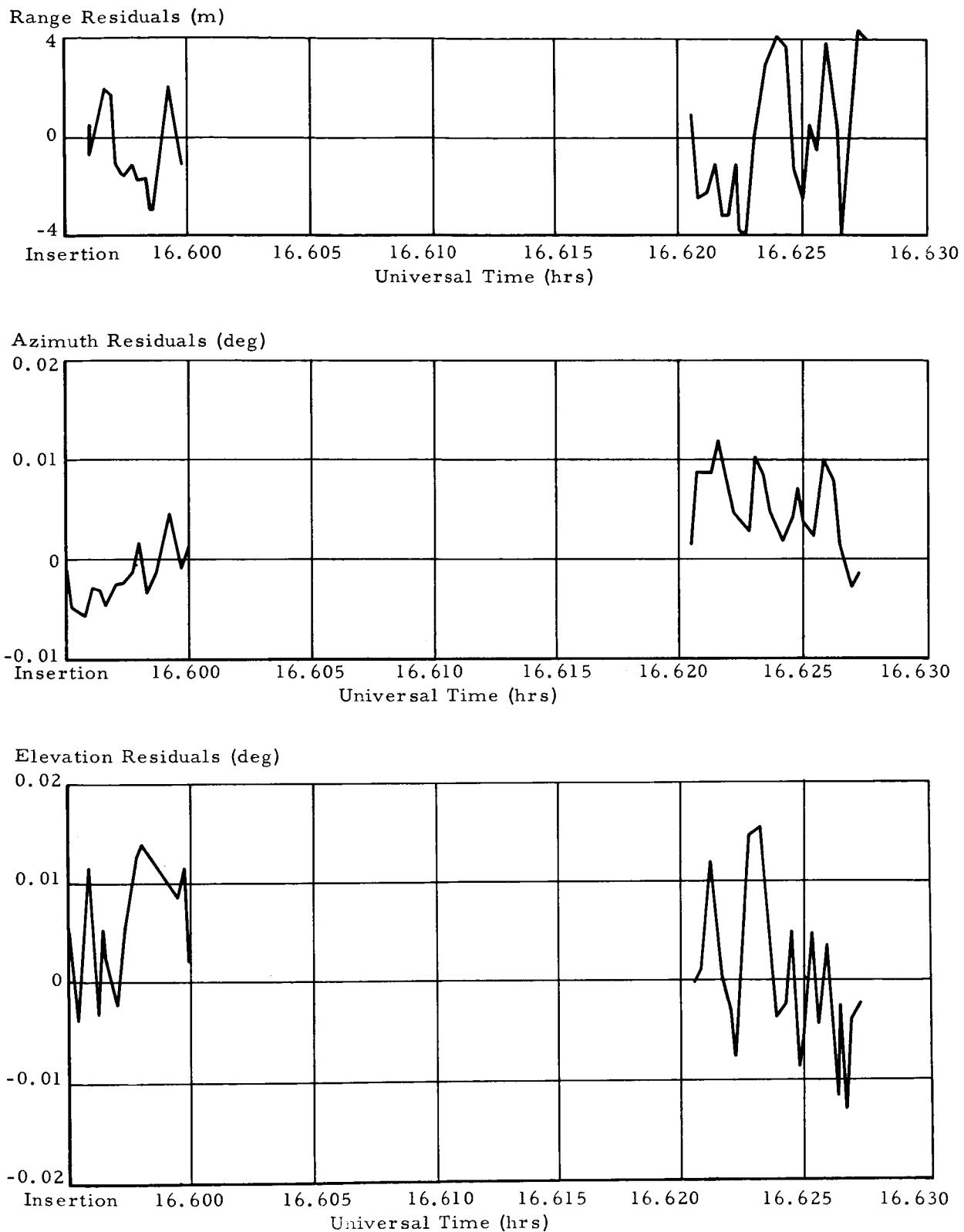
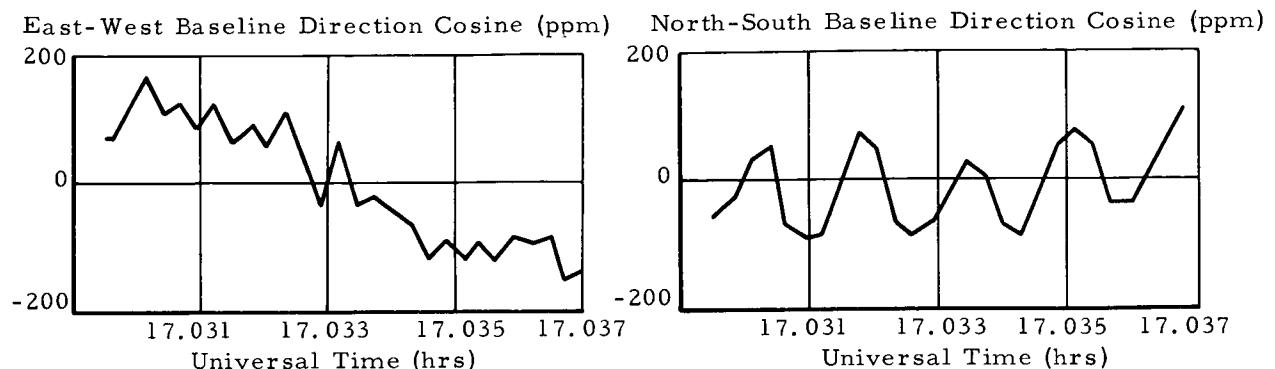


FIGURE 19 ANTIGUA RADAR RESIDUALS

First Pass



Second Pass

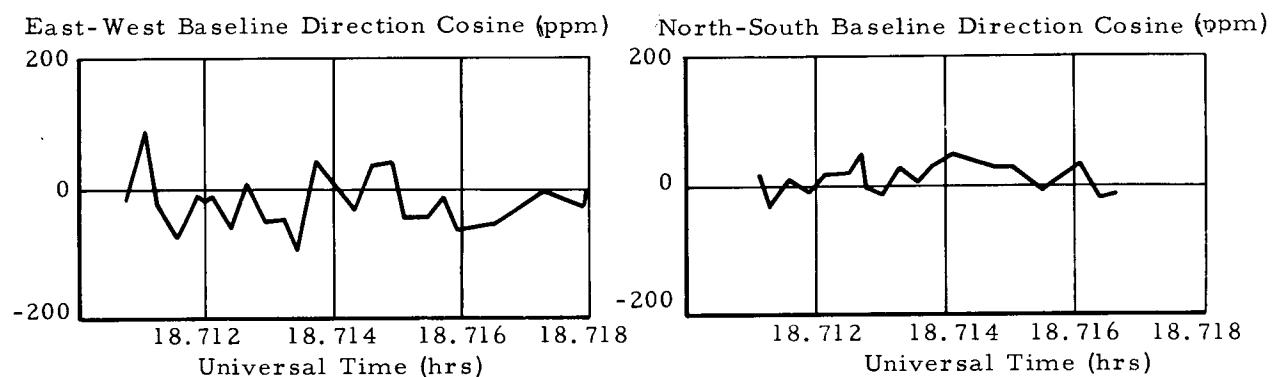


FIGURE 20 JOHANNESBURG, SOUTH AFRICA MINITRACK RESIDUALS

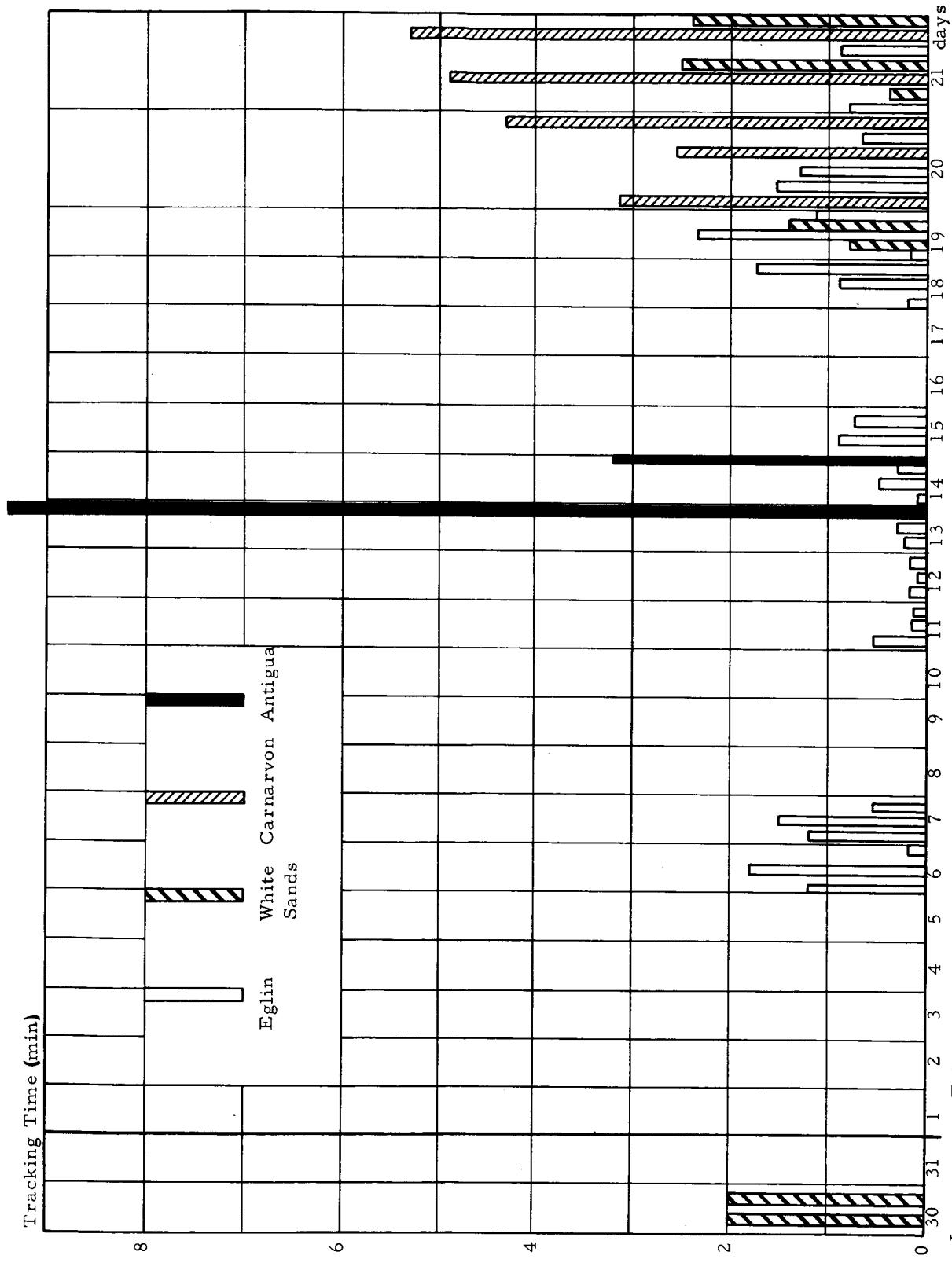


FIGURE 21      SA-5 RADAR SKIN-TRACK PERFORMANCE

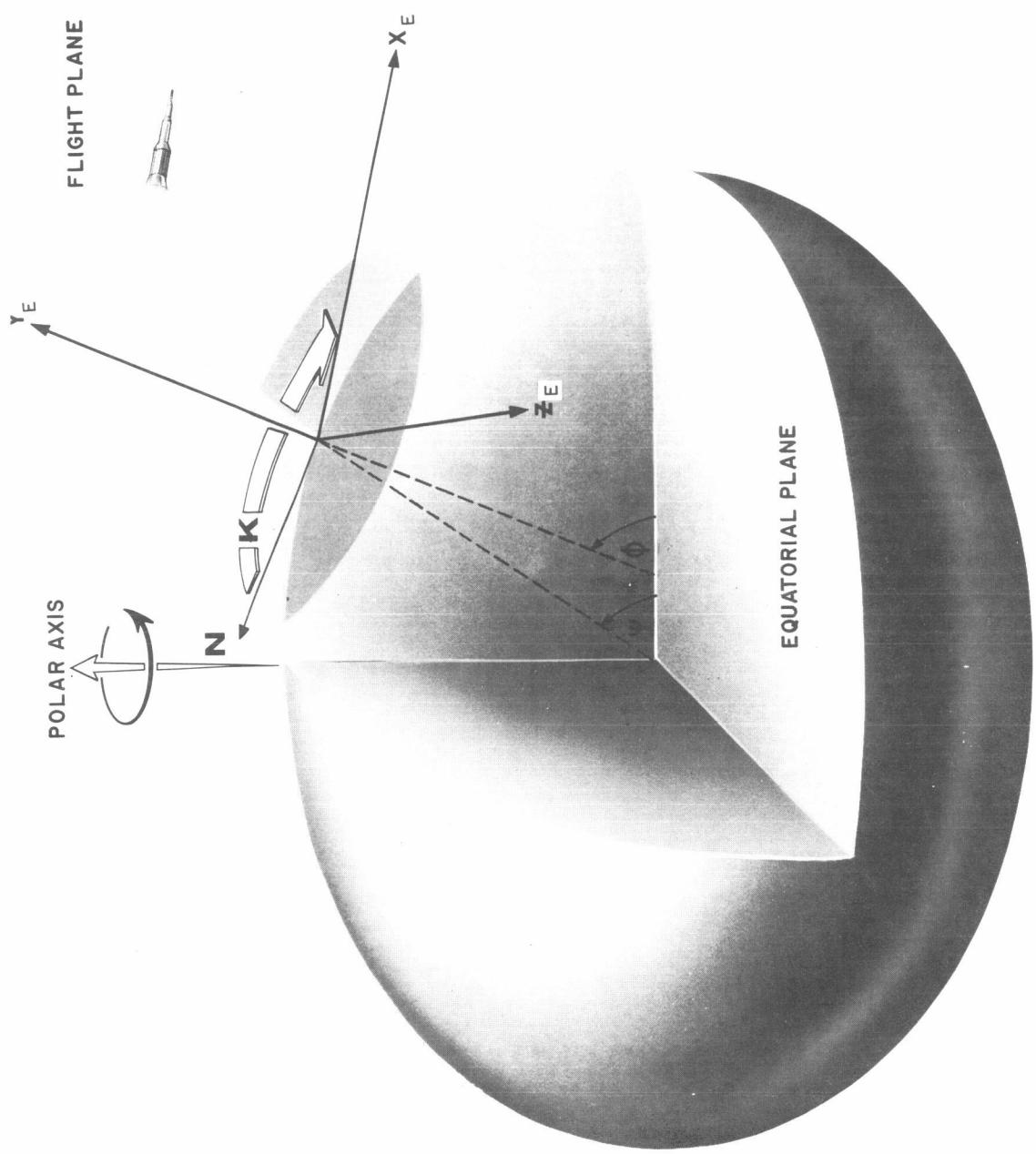


FIGURE 22 EARTH-FIXED COORDINATE SYSTEM

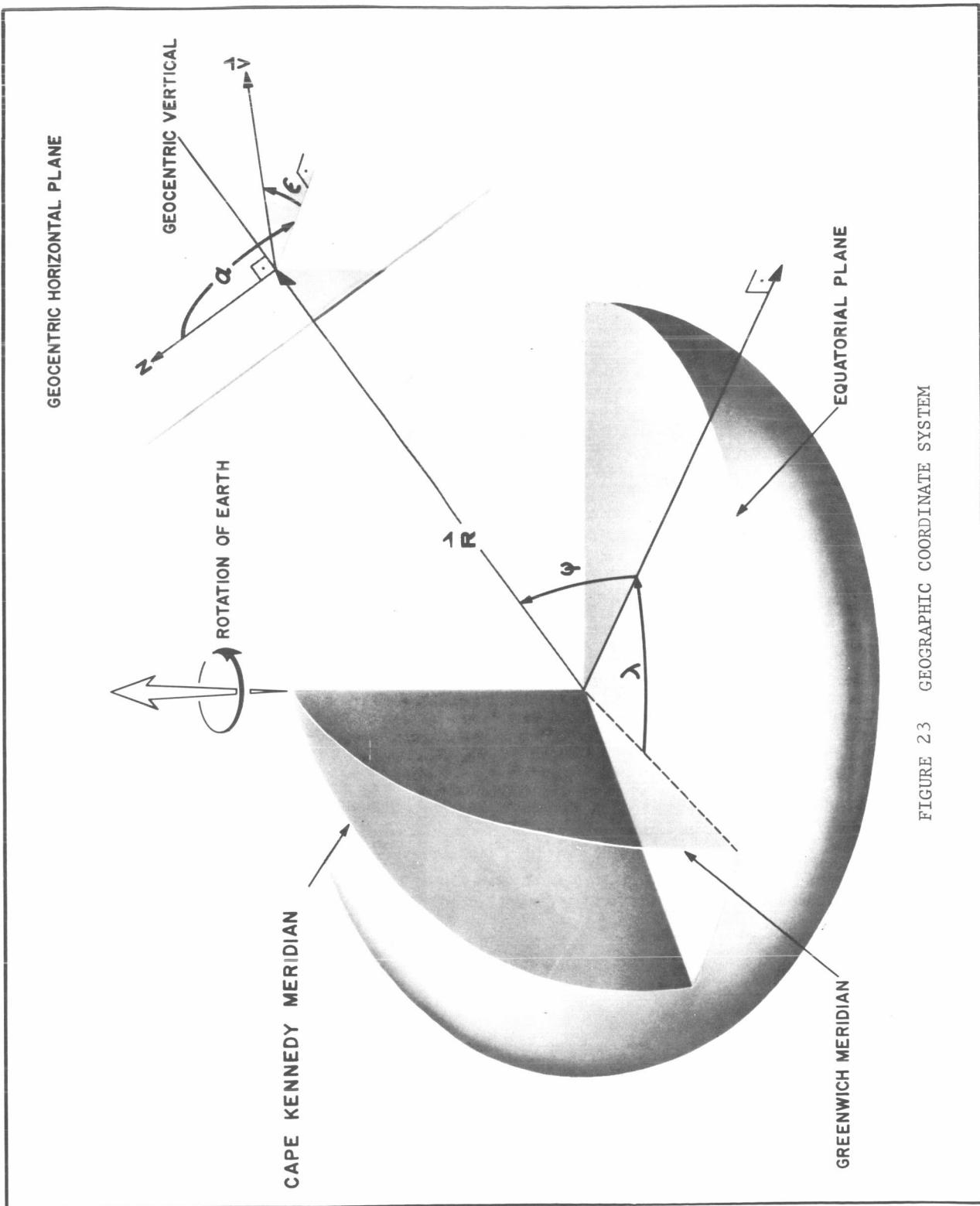


FIGURE 23 GEOGRAPHIC COORDINATE SYSTEM

TABLE I (U)      TRACKING DATA SOURCES

<u>Data Source</u>	<u>Time Available (sec)</u>
Fixed Camera	0.367 - 20.2
Theodolite	11.8 - 32.2 34.4 - 36.8 39.2 - 41.0 65.4 - 99.8
Azusa	13.00 - 37.25 42.50 - 468.25
UDOP	0.4 - 130.0 133.0 - 147.0 153.0 - 201.4 203.0 - 492.5
MISTRAM	35.20 - 329.45 332.0 - 620.0
Cape Kennedy (1.16) Radar (FPS-16)	6.0 - 177.0 184.0 - 385.0
G. B. I. (3.16) Radar (FPS-16)	90.0 - 177.1 184.0 - 404.7 413.4 - 550.0
San Salvador (5.16) Radar (FPS-16)	155.0 - 364.2 386.0 - 667.0
Antigua (91.18) Radar (FPQ-6)	420.0 - 561.5 569.2 - 659.0 733.0 - 757.9
Patrick AFB (0.18) Radar (FPQ-6) (tracked S-I booster after separation)	13.4 - 377.0 384.05 - 398.95

TABLE II (U) TIMES OF EVENTS

Event	Actual	Range Time (sec)	
		Nominal	Act.- Nom
Ignition Command	- 2.99	- 3.00	0.01
Commit	0	0	0
First Motion	0.31	-	-
Liftoff Signal (Start Program Device)	0.41	-	-
Begin Roll Maneuver	8.78	8.41	0.37
End Roll Maneuver	13.05	13.82	-0.60
Begin Tilt	15.71	15.41	0.30
LH <sub>2</sub> Prestart and Six Movie Cameras On	107.66	107.66	0 00
Freeze Tilt	133.31	134.41	-1.10
S-IV LOX Prestart (Ports Blown Open)	139.80	140.11	-0.31
IECO	140.75	140.93*	-0.18
OECO	146.73	146.93*	-0.20
Ullage Rocket Ignition	147.02	147.30	-0.28
S-I/S-IV Separation	147.14	147.41	-0.27
Retro Rocket Ignition	147.16	147.43	-0.27
S-IV Ignition	148.84	149.11	-0.27
Jettison Ullage Rockets	167.14	167.40	-0.26
Resume Tilt	174.11	170.41	3.70
S-IV CO	629.97	630.24*	-0.27
End Tilt	630.07	630.45	-0.38
Insertion	639.97	640.35	-0.38

\*Referenced to first motion; other times are referenced to start of program device.

TABLE III (C) SIGNIFICANT TRAJECTORY PARAMETERS (S-I BOOSTER)

<u>Event</u>	<u>Parameter</u>	<u>Actual</u>	<u>Nominal</u>	<u>Act-Nom</u>
First Motion	Range Time (sec)	0.31	0.31*	0.00
	Longitudinal Acceleration (m/sec <sup>2</sup> )	13.09	12.99	0.10
Mach One	Range Time (sec)	54.693	54.206*	0.487
	Altitude (km)	7.060	7.061	-0.001
Maximum Dynamic Pressure	Range Time (sec)	69.21	69.09*	0.12
	Dynamic Pressure (N/cm <sup>2</sup> )	3.538	3.472	0.066
	Altitude (km)	12.040	12.207	-0.167
Maximum Acceleration	Range Time (sec)	140.90	140.93*	-0.03
	Longitudinal Acceleration (m/sec <sup>2</sup> )	58.00	57.53	0.47
Maximum Velocity	Range Time (sec)	147.00	147.30*	-0.30
	Earth-Fixed Velocity (m/sec)	2732.7	2700.9	31.8
Apex	Range Time (sec)	303.0	302.9*	0.1
	Altitude (km)	175.56	175.68	-0.12
	Range (km)	454.04	444.72	9.32
	Earth-Fixed Velocity (m/sec)	2340.4	2305.3	35.1
Loss of Telemetry	Range Time (sec)	476.7	476.7*	0.0
	Altitude (km)	52.24	51.29	0.95
	Range (km)	853.15	839.61	13.54
	Total Acceleration (m/sec <sup>2</sup> )	-7.955	-5.250	-2.705
	Elevation Angle From Pad (deg)	-0.35	-0.30	-0.05

\*First motion time has been added for comparison purposes.

TABLE IV (C) CUTOFF CONDITIONS

Parameter	Actual	IECO Nominal	Act-Nom	Actual	OECO Nominal	Act-Nom	Actual	S-IV CO Nominal	Act-Nom
Range Time (sec)	140.75	140.93*	- 0.18	146.73	146.93*	- 0.20	629.97	630.24*	- 0.27
Altitude (km)	67.59	68.08	- 0.49	75.21	75.74	- 0.53	262.46	255.96	6.50
Ground Range (km)	77.98	76.27	1.71	91.70	89.84	1.86	2098.65	2080.16	18.49
Cross Range (Z <sub>E</sub> , Figure 22) (km)	- 0.68	0.74	- 1.42	- 0.77	0.85	- 1.62	21.47	42.76	- 21.29
Cross Range Velocity (m/sec)	- 14.20	18.30	- 32.50	- 13.66	20.20	- 33.86	133.26	178.90	- 45.64
Earth-Fixed Velocity (m/sec)	2567.36	2537.40	. 29.96	2725.73	2694.50	31.23	7478.60	7451.60	27.00
Velocity Vector Elevation (deg)	29.31	29.71	- 0.40	28.35	28.72	- 0.37	0.28	- 0.01	0.29
Velocity Vector Azimuth (deg)	104.92	105.74	- 0.82	105.02	105.82	- 0.80	114.52	114.78	- 0.26
Space-Fixed Velocity (m/sec)	2924.67	2892.50	32.17	3085.85	3052.50	33.35	7889.36	7861.40	27.96
Space-Fixed Cross Range Velocity (m/sec)	-139.73	-107.10	-32.63	-141.37	-107.30	-34.07	-180.73	-133.70	-47.03
Longitudinal Acceleration (m/sec <sup>2</sup> )	57.81	57.53	0.28	30.61	29.72	0.89	22.99	22.95	0.04

\*First motion time has been added for comparison purposes.

TABLE V (U) BOOSTER FREE FLIGHT TRAJECTORY

Time (Sec)	X <sub>E</sub> (m)	Y <sub>E</sub> (m)	Z <sub>E</sub> (m)	DXE (m/sec)	Earth-Fixed Velocity DYE (m/sec)	DZE (m/sec)	Altitude (m)	Range (m)
160	124777	90472	- 923	2402	1132	- 10	91228	122913
180	172745	111246	- 1097	2395	944	- 8	113546	169661
200	220568	128343	- 1186	2380	778	- 2	132081	216038
220	268231	141818	- 1209	2378	583	2	147334	262139
240	315715	151663	- 1142	2369	405	6	159291	308022
260	363006	157909	- 994	2359	221	9	167979	353732
280	410092	160535	- 786	2348	41	12	173379	399291
300	456944	159573	- 511	2336	- 137	15	175517	4444480
320	503544	155026	- 173	2323	- 317	18	174396	490780
340	549874	146895	225	2309	- 496	21	170016	535228
360	595916	135176	682	2294	- 675	24	162371	581528
380	641652	119862	1193	2278	- 855	26	151456	627728
400	687062	100943	1755	2262	- 1036	29	137259	672276
420	732128	78404	2365	2244	- 1217	31	119768	720428
440	776828	52226	3020	2225	- 1400	34	98965	766728
460	821134	22393	3716	2204	- 1582	36	74836	813028
480	864657	- 10840	4444	2119	- 1717	36	47584	861180
500	898934	- 40264	5046	975	- 914	17	23152	898220
520	907519	- 49464	5147	147	- 225	3	15255	907480
540	909318	- 53550	5027	53	- 191	9	11467	909332
560	910033	- 57054	4829	23	- 160	- 7	8099	911184
580	910296	- 59975	4734	4	- 133	- 1	5246	912665
600	910259	- 62460	4770	7	- 116	4	2781	912980
620	910045	- 64628	4895	- 15	- 100	8	604	913036
626.03	909946	- 65225	4947	- 17	- 97	8	0	913073

TABLE VI (U) ORBITAL ELEMENTS AT INSERTION

Orbital Parameters

Semi-Major Axis (km)	6889.8540
Eccentricity	0.03694983
Inclination (deg)	31.4573
Right Ascension of Ascending Node (deg)	177.0167
Argument of Perigee (deg)	126.9347
True Anomaly (deg)	8.0857
Apparent Sidereal Time (deg) (zero hrs U. T., Jan 29, 1964)	127.2846

Geographic Parameters

Space-Fixed Velocity (m/sec)	7889.8979
Azimuth of Space-Fixed Velocity (deg clockwise from north)	113.4003
Elevation of Space-Fixed Velocity (deg from local horizontal)	0.2873
Altitude from Earth Center (km)	6637.6264
Geocentric Latitude (deg north)	21.6466
Longitude (deg east)	-60.3151

TABLE VII (U)

TIME SEC	EARTH-FIXED-POSITION			EARTH-FIXED-VELOCITY		
	XE M	YE M	ZE M	DXE M/SEC	DYE M/SEC	DZE M/SEC
<b>FIRST MOTION</b>						
0.310	0	32	0	0.	0.	0.
<b>LIFTOFF SIGNAL</b>						
0.410	0	32	0	0.0	0.3	-0.0
1.0	0	33	0	0.1	2.3	-0.1
2.0	0	37	0	0.1	5.6	-0.1
3.0	0	44	0	0.0	9.1	-0.2
4.0	0	55	0	-0.0	12.6	-0.2
5.0	0	69	-0	-0.1	16.1	-0.2
6.0	0	87	-0	-0.1	19.8	-0.2
7.0	0	109	-0	-0.2	23.6	-0.3
8.0	0	134	-0	-0.2	27.5	-0.3
9.0	-0	164	-1	-0.2	31.4	-0.2
10.0	-0	197	-1	-0.3	35.5	-0.2
11.0	-0	234	-1	-0.3	39.6	-0.2
12.0	-0	276	-2	-0.4	43.9	-0.1
13.0	-1	322	-2	-0.5	48.2	-0.1
14.0	-1	372	-2	-0.6	52.6	0.0
15.0	-2	427	-2	-0.6	57.2	0.1
16.0	-3	487	-2	-0.6	61.8	0.2
17.0	-3	551	-1	-0.5	66.6	0.3
18.0	-4	620	-1	-0.3	71.4	0.5
19.0	-4	694	-0	0.0	76.3	0.6
20.0	-4	773	-0	0.5	81.4	0.7
21.0	-4	856	0	1.2	86.5	0.8
22.0	-3	945	1	2.1	91.6	1.0
23.0	-0	1040	2	3.3	96.9	1.1
24.0	3	1139	4	4.7	102.1	1.2
25.0	8	1244	5	6.4	107.5	1.4
26.0	15	1354	6	8.3	112.8	1.5
27.0	24	1470	8	10.5	118.2	1.6
28.0	36	1590	10	13.0	123.6	1.8
29.0	50	1717	12	15.7	129.1	1.9
30.0	67	1849	14	18.6	134.7	2.1

TABLE VII (U)

TIME SEC	EARTH-FIXED-POSITION			EARTH-FIXED-VELOCITY		
	X <sub>E</sub> M	Y <sub>E</sub> M	Z <sub>E</sub> M	D <sub>XE</sub> M/SEC	D <sub>YE</sub> M/SEC	D <sub>ZE</sub> M/SEC
31.0	86	1986	16	21.7	140.4	2.3
32.0	110	2129	18	25.2	146.1	2.5
33.0	136	2278	21	28.8	151.9	2.6
34.0	167	2433	24	32.8	157.8	2.7
35.0	201	2594	26	36.9	163.7	2.8
36.0	240	2761	29	41.2	169.6	2.8
37.0	283	2933	32	45.7	175.6	2.8
38.0	331	3112	35	50.3	181.7	2.8
39.0	384	3297	38	55.1	187.8	2.8
40.0	441	3488	41	60.0	194.0	2.8
41.0	503	3685	43	65.0	200.4	2.8
42.0	571	3889	46	70.2	206.8	2.7
43.0	643	4099	49	75.5	213.3	2.6
44.0	722	4315	52	80.9	219.8	2.5
45.0	805	4539	54	86.4	226.5	2.4
46.0	894	4768	56	92.0	233.2	2.3
47.0	989	5005	59	97.7	240.1	2.2
48.0	1089	5249	61	103.5	247.0	2.1
49.0	1196	5499	63	109.5	254.0	2.1
50.0	1308	5757	65	115.6	261.0	1.9
51.0	1427	6021	67	122.0	268.1	1.8
52.0	1552	6293	69	128.6	275.2	1.6
53.0	1684	6572	70	135.5	282.2	1.4
54.0	1822	6857	71	142.5	289.1	1.2
MACH ØNE						
54.693	1923	7060	72	147.4	293.9	1.1
55.0	1968	7150	73	149.6	295.9	1.0
56.0	2121	7449	74	156.9	302.5	0.8
57.0	2282	7755	74	164.3	309.0	0.6
58.0	2450	8068	75	171.9	315.5	0.3
59.0	2625	8386	75	179.7	322.0	0.0
60.0	2809	8712	75	187.7	328.6	-0.2
61.0	3000	9044	75	196.0	335.4	-0.5
62.0	3200	9383	74	204.7	342.2	-0.8
63.0	3409	9729	73	213.6	349.2	-1.1
64.0	3627	10081	72	222.9	356.2	-1.6
65.0	3855	10441	70	232.4	363.5	-2.2

TABLE VII (U)

TIME SEC	EARTH-FIXED-POSITION			EARTH-FIXED-VELOCITY		
	XE M	YE M	ZE M	DXE M/SEC	DYE M/SEC	DZE M/SEC
66.0	4092	10809	67	242.1	370.9	-2.9
67.0	4339	11183	64	252.0	378.5	-3.6
68.0	4596	11566	60	262.2	386.3	-4.3
69.0	4862	11955	55	272.8	394.2	-4.8
MAXIMUM DYNAMIC PRESSURE						
69.210	4919	12038	54	275.0	395.9	-4.9
70.0	5139	12352	49	283.6	402.2	-5.3
71.0	5427	12758	42	294.8	410.4	-5.7
72.0	5727	13172	35	306.3	418.8	-6.0
73.0	6039	13595	29	318.2	427.2	-6.3
74.0	6363	14027	23	330.5	435.8	-6.7
75.0	6700	14467	16	343.1	444.5	-7.1
76.0	7049	14916	9	356.3	453.2	-7.5
77.0	7412	15374	1	369.9	462.1	-7.8
78.0	7789	15840	-6	383.9	471.0	-8.1
79.0	8180	16316	-14	398.3	480.1	-8.2
80.0	8585	16801	-22	413.1	489.3	-8.2
81.0	9006	17295	-30	428.3	498.5	-8.3
82.0	9442	17799	-39	443.9	508.0	-8.5
83.0	9893	18311	-47	460.0	517.5	-8.7
84.0	10361	18834	-56	476.5	527.1	-8.9
85.0	10846	19366	-65	493.5	536.7	-9.0
86.0	11348	19908	-74	511.0	546.5	-9.1
87.0	11868	20459	-83	528.9	556.4	-9.1
88.0	12406	21021	-92	547.1	566.4	-9.1
89.0	12962	21592	-101	565.6	576.6	-9.2
90.0	13537	22174	-110	584.7	586.9	-9.2
91.0	14132	22766	-120	604.2	597.2	-9.1
92.0	14746	23369	-129	624.2	607.7	-9.1
93.0	15380	23982	-138	644.6	618.3	-9.0
94.0	16035	24606	-147	665.4	628.9	-9.1
95.0	16711	25240	-156	686.5	639.7	-9.2
96.0	17408	25886	-165	708.1	650.5	-9.3
97.0	18127	26542	-174	730.1	661.5	-9.3
98.0	18868	27209	-183	752.7	672.5	-9.2
99.0	19633	27887	-193	775.9	683.6	-9.0
100.0	20420	28576	-202	799.6	694.7	-8.9

TABLE VII (W)

TIME SEC	EARTH-FIXED-POSITION			EARTH-FIXED-VELOCITY		
	XE M	YE M	ZE M	DXE M/SEC	DYE M/SEC	DZE M/SEC
101.0	21232	29277	-210	823.5	706.0	-8.8
102.0	22068	29989	-219	847.8	717.4	-8.9
103.0	22928	30712	-228	872.5	728.9	-9.1
104.0	23813	31447	-237	897.6	740.6	-9.3
105.0	24723	32194	-247	923.2	752.3	-9.5
106.0	25659	32952	-256	949.4	764.0	-9.7
107.0	26622	33722	-266	976.2	775.9	-9.7
108.0	27612	34504	-276	1003.5	787.8	-9.8
109.0	28629	35298	-286	1031.2	799.9	-9.9
110.0	29674	36104	-296	1059.4	812.0	-10.0
111.0	30748	36922	-306	1088.2	824.2	-10.1
112.0	31851	37753	-316	1117.4	836.5	-10.2
113.0	32983	38596	-326	1147.2	848.9	-10.5
114.0	34146	39451	-337	1177.6	861.3	-10.8
115.0	35339	40319	-348	1208.6	873.8	-11.1
116.0	36563	41199	-359	1240.2	886.3	-11.3
117.0	37820	42092	-370	1272.5	898.8	-11.5
118.0	39108	42997	-382	1305.3	911.4	-11.7
119.0	40431	43915	-394	1338.8	924.1	-11.9
120.0	41786	44846	-406	1373.0	936.8	-12.0
121.0	43177	45789	-418	1407.8	949.6	-12.2
122.0	44602	46745	-430	1443.3	962.4	-12.4
123.0	46064	47714	-443	1479.5	975.3	-12.6
124.0	47562	48696	-455	1516.4	988.2	-12.7
125.0	49097	49691	-468	1554.1	1001.2	-12.8
126.0	50671	50699	-481	1592.6	1014.2	-12.9
127.0	52283	51720	-494	1631.8	1027.2	-13.0
128.0	53935	52754	-507	1671.8	1040.3	-13.1
129.0	55627	53801	-520	1712.7	1053.4	-13.2
130.0	57360	54862	-534	1754.4	1066.6	-13.3
131.0	59136	55935	-547	1796.9	1079.9	-13.4
132.0	60955	57022	-560	1840.3	1093.3	-13.5
133.0	62817	58122	-574	1884.5	1107.0	-13.6
134.0	64725	59236	-588	1929.5	1121.0	-13.7
135.0	66677	60364	-601	1975.3	1135.4	-13.9
136.0	68676	61507	-615	2021.5	1150.3	-13.9
137.0	70722	62665	-629	2069.1	1165.6	-14.0
138.0	72817	63840	-644	2117.5	1181.6	-14.1
139.0	74961	65030	-658	2166.7	1197.9	-14.1
140.0	77155	66237	-672	2216.9	1214.7	-14.2

TABLE VII (U)

TIME SEC	EARTH-FIXED-POSITION			EARTH-FIXED-VELOCITY		
	XE M	YE M	ZE M	DXE M/SEC	DYE M/SEC	DZE M/SEC
IECØ SIGNAL						
140.750	78848	67109	-684	2254.7	1227.8	-14.2
141.0	79391	67457	-686	2267.3	1231.8	-14.2
142.0	81668	68688	-700	2293.9	1236.5	-14.1
143.0	83976	69927	-714	2320.2	1241.0	-14.1
144.0	86313	71171	-729	2346.2	1245.5	-14.0
145.0	88676	72420	-742	2372.2	1249.7	-13.8
146.0	91064	73676	-754	2398.6	1254.3	-13.7
ØECØ SIGNAL						
146.730	92828	74543	-766	2418.1	1257.8	-13.7
147.0	93473	74932	-767	2424.3	1258.8	-13.6
SEPARATION SIGNAL						
147.140	93811	75107	-768	2424.5	1257.8	-13.6
148.0	95905	76191	-781	2425.6	1250.4	-13.5
S-IV IGNITION SIGNAL						
148.840	97944	77239	-793	2426.2	1242.7	-13.3
149.0	98333	77437	-795	2426.3	1241.3	-13.3
150.0	100761	78674	-809	2427.1	1232.5	-13.1
151.0	103190	79901	-824	2430.3	1225.2	-13.0
152.0	105621	81120	-837	2436.0	1219.0	-12.9
153.0	108058	82336	-849	2441.4	1212.8	-12.7
154.0	110502	83546	-861	2446.7	1206.7	-12.5
155.0	112951	84749	-873	2452.5	1200.3	-12.3
156.0	115406	85946	-886	2457.7	1193.8	-12.2
157.0	117867	87137	-898	2463.1	1187.7	-12.0
158.0	120332	88322	-910	2468.5	1181.5	-11.8
159.0	122804	89500	-921	2473.9	1175.3	-11.6
160.0	125280	90672	-933	2479.4	1169.1	-11.5

TABLE VII (U)

TIME SEC	EARTH-FIXED-POSITION			EARTH-FIXED-VELOCITY		
	XE M	YE M	ZE M	DXE M/SEC	DYE M/SEC	DZE M/SEC
161.0	127762	91838	-944	2484.8	1162.9	-11.3
162.0	130250	92998	-955	2490.3	1156.8	-11.1
163.0	132743	94152	-967	2495.8	1150.6	-11.0
164.0	135241	95299	-977	2501.2	1144.4	-10.8
165.0	137745	96441	-988	2506.7	1138.3	-10.6
166.0	140255	97576	-999	2512.1	1132.2	-10.4
167.0	142769	98705	-1009	2517.6	1126.1	-10.2
168.0	145290	99828	-1019	2523.1	1120.0	-10.0
169.0	147816	100945	-1029	2528.5	1114.0	-9.9
170.0	150347	102056	-1039	2534.0	1107.9	-9.7
171.0	152884	103161	-1048	2539.6	1101.8	-9.5
172.0	155426	104260	-1058	2545.1	1095.7	-9.4
173.0	157974	105352	-1067	2550.6	1089.6	-9.3
174.0	160527	106439	-1076	2556.2	1083.4	-9.1
175.0	163086	107519	-1085	2561.7	1077.3	-9.0
176.0	165651	108594	-1094	2567.3	1071.2	-8.9
177.0	168221	109662	-1103	2572.8	1065.2	-8.7
178.0	170796	110724	-1112	2578.4	1059.1	-8.4
179.0	173377	111780	-1120	2583.9	1053.1	-8.2
180.0	175964	112830	-1128	2589.5	1047.0	-7.9
181.0	178556	113874	-1136	2595.1	1040.9	-7.7
182.0	181154	114912	-1144	2600.7	1034.8	-7.5
183.0	183758	115944	-1151	2606.3	1028.7	-7.4
184.0	186367	116969	-1158	2611.9	1022.6	-7.2
185.0	188982	117989	-1166	2617.5	1016.6	-7.1
186.0	191602	119002	-1173	2623.1	1010.6	-6.9
187.0	194228	120010	-1179	2628.7	1004.6	-6.8
188.0	196859	121012	-1186	2634.3	998.5	-6.6
189.0	199496	122007	-1193	2640.0	992.5	-6.4
190.0	202139	122997	-1199	2645.6	986.5	-6.2
191.0	204788	123980	-1205	2651.3	980.5	-5.9
192.0	207442	124958	-1211	2656.9	974.4	-5.8
193.0	210101	125929	-1217	2662.6	968.4	-5.6
194.0	212767	126894	-1222	2668.3	962.3	-5.5
195.0	215438	127854	-1227	2674.1	956.2	-5.3
196.0	218115	128807	-1233	2679.8	950.1	-5.2
197.0	220798	129754	-1238	2685.5	944.1	-5.0
198.0	223486	130695	-1243	2691.3	938.0	-4.8
199.0	226180	131630	-1247	2697.1	931.8	-4.7
200.0	228880	132558	-1252	2703.0	925.6	-4.5

TABLE VII (U)

TIME SEC	EARTH-FIXED-POSITION			EARTH-FIXED-VELOCITY		
	XE M	YE M	ZE M	DXE M/SEC	DYE M/SEC	DZE M/SEC
201.0	231586	133481	-1256	2708.8	919.5	-4.3
202.0	234298	134397	-1261	2714.5	913.5	-4.1
203.0	237015	135308	-1265	2720.3	907.6	-3.9
204.0	239738	136213	-1268	2726.0	901.6	-3.7
205.0	242467	137111	-1272	2731.8	895.6	-3.6
206.0	245202	138004	-1276	2737.6	889.5	-3.5
207.0	247943	138890	-1279	2743.5	883.4	-3.4
208.0	250689	139771	-1282	2749.4	877.3	-3.3
209.0	253441	140645	-1286	2755.3	871.2	-3.0
210.0	256200	141513	-1288	2761.1	865.1	-2.8
211.0	258964	142375	-1291	2767.0	859.1	-2.6
212.0	261734	143231	-1294	2772.9	853.1	-2.4
213.0	264509	144081	-1296	2778.8	847.0	-2.2
214.0	267291	144925	-1298	2784.6	841.0	-2.1
215.0	270079	145763	-1300	2790.6	835.0	-2.0
216.0	272872	146595	-1302	2796.5	828.8	-1.9
217.0	275672	147421	-1304	2802.5	822.8	-1.7
218.0	278477	148241	-1305	2808.5	816.7	-1.4
219.0	281289	149053	-1306	2814.5	810.7	-1.2
220.0	284108	149859	-1307	2820.6	804.7	-0.9
221.0	286933	150659	-1308	2826.7	798.7	-0.7
222.0	289763	151454	-1308	2832.7	792.7	-0.5
223.0	292599	152244	-1308	2838.8	786.7	-0.3
224.0	295441	153028	-1308	2844.8	780.6	-0.1
225.0	298289	153805	-1308	2850.9	774.5	0.1
226.0	301143	154577	-1308	2856.9	768.4	0.3
227.0	304003	155342	-1308	2863.0	762.4	0.5
228.0	306869	156101	-1307	2869.1	756.3	0.7
229.0	309741	156855	-1306	2875.2	750.2	0.9
230.0	312619	157602	-1305	2881.3	744.1	1.1
231.0	315504	158343	-1304	2887.4	738.1	1.3
232.0	318394	159078	-1303	2893.6	732.0	1.5
233.0	321291	159807	-1301	2899.7	725.9	1.7
234.0	324194	160530	-1299	2905.8	719.8	1.9
235.0	327102	161247	-1297	2912.0	713.8	2.1
236.0	330018	161957	-1295	2918.2	707.7	2.3
237.0	332939	162662	-1293	2924.4	701.6	2.5
238.0	335866	163361	-1290	2930.7	695.6	2.7
239.0	338800	164053	-1287	2936.9	689.5	2.9
240.0	341740	164740	-1284	2943.2	683.4	3.1

TABLE VII (U)

TIME SEC	EARTH-FIXED-POSITION			EARTH-FIXED-VELOCITY		
	XE M	YE M	ZE M	DXE M/SEC	DYE M/SEC	DZE M/SEC
241.0	344687	165420	-1281	2949.4	677.4	3.3
242.0	347639	166094	-1278	2955.7	671.3	3.5
243.0	350598	166763	-1274	2962.0	665.2	3.7
244.0	353563	167425	-1270	2968.3	659.2	3.9
245.0	356535	168081	-1266	2974.6	653.1	4.1
246.0	359512	168731	-1262	2980.9	647.0	4.3
247.0	362496	169375	-1258	2987.2	640.9	4.5
248.0	365487	170013	-1253	2993.6	634.7	4.7
249.0	368483	170644	-1248	2999.9	628.6	4.9
250.0	371487	171270	-1243	3006.3	622.5	5.1
251.0	374496	171889	-1238	3012.6	616.4	5.3
252.0	377512	172503	-1233	3019.0	610.3	5.6
253.0	380534	173110	-1227	3025.4	604.3	5.8
254.0	383563	173711	-1221	3031.8	598.1	6.0
255.0	386598	174306	-1215	3038.3	592.0	6.2
256.0	389639	174895	-1209	3044.7	585.9	6.4
257.0	392687	175478	-1202	3051.1	579.7	6.6
258.0	395741	176055	-1196	3057.5	573.6	6.8
259.0	398802	176625	-1189	3064.0	567.5	7.0
260.0	401869	177190	-1181	3070.4	561.3	7.2
261.0	404943	177748	-1174	3076.9	555.2	7.4
262.0	408023	178300	-1167	3083.4	549.0	7.7
263.0	411110	178846	-1159	3090.0	542.9	7.9
264.0	414203	179386	-1151	3096.5	536.7	8.1
265.0	417303	179919	-1143	3103.0	530.6	8.3
266.0	420409	180447	-1134	3109.5	524.5	8.5
267.0	423522	180968	-1126	3116.1	518.3	8.7
268.0	426641	181484	-1117	3122.7	512.2	9.0
269.0	429767	181993	-1108	3129.2	506.0	9.2
270.0	432900	182496	-1098	3135.9	499.8	9.4
271.0	436039	182992	-1089	3142.5	493.7	9.6
272.0	439185	183483	-1079	3149.2	487.5	9.8
273.0	442337	183967	-1069	3155.8	481.3	10.0
274.0	445497	184446	-1059	3162.5	475.2	10.2
275.0	448662	184918	-1049	3169.2	469.0	10.5
276.0	451835	185384	-1038	3175.9	462.8	10.7
277.0	455014	185843	-1027	3182.6	456.6	10.9
278.0	458200	186297	-1016	3189.3	450.4	11.2
279.0	461393	186744	-1005	3196.0	444.3	11.4
280.0	464592	187185	-994	3202.7	438.1	11.6

TABLE VII (U)

TIME SEC	EARTH-FIXED-POSITION			EARTH-FIXED-VELOCITY		
	XE M	YE M	ZE M	DXE M/SEC	DYE M/SEC	DZE M/SEC
281.0	467798	187620	-982	3209.4	431.9	11.8
282.0	471011	188049	-970	3216.0	425.7	12.0
283.0	474230	188472	-958	3222.7	419.5	12.3
284.0	477456	188888	-945	3229.4	413.3	12.5
285.0	480689	189298	-933	3236.1	407.1	12.7
286.0	483928	189702	-920	3242.9	400.9	12.9
287.0	487175	190100	-907	3249.7	394.7	13.1
288.0	490428	190492	-894	3256.6	388.5	13.4
289.0	493688	190877	-880	3263.4	382.3	13.6
290.0	496955	191256	-867	3270.3	376.1	13.8
291.0	500228	191629	-853	3277.2	369.8	14.1
292.0	503509	191996	-838	3284.1	363.6	14.3
293.0	506797	192356	-824	3291.0	357.4	14.5
294.0	510091	192710	-809	3298.0	351.1	14.8
295.0	513392	193058	-795	3304.9	344.9	15.0
296.0	516701	193400	-779	3311.8	338.7	15.2
297.0	520016	193736	-764	3318.8	332.5	15.5
298.0	523338	194065	-749	3325.7	326.3	15.7
299.0	526668	194388	-733	3332.7	320.0	15.9
300.0	530004	194705	-717	3339.7	313.8	16.1
301.0	533347	195016	-700	3346.8	307.5	16.4
302.0	536697	195320	-684	3353.8	301.3	16.6
303.0	540055	195618	-667	3360.9	295.1	16.8
304.0	543419	195910	-650	3367.9	288.8	17.1
305.0	546791	196196	-633	3375.0	282.6	17.3
306.0	550169	196475	-616	3382.1	276.3	17.5
307.0	553555	196749	-598	3389.3	270.0	17.7
308.0	556948	197015	-580	3396.4	263.7	18.0
309.0	560348	197276	-562	3403.6	257.4	18.3
310.0	563755	197530	-544	3410.7	251.1	18.5
311.0	567169	197778	-525	3417.9	244.9	18.8
312.0	570591	198020	-506	3425.1	238.6	19.0
313.0	574019	198255	-487	3432.3	232.3	19.3
314.0	577455	198485	-467	3439.5	226.0	19.5
315.0	580898	198707	-448	3446.7	219.7	19.7
316.0	584349	198924	-428	3454.0	213.4	20.0
317.0	587806	199134	-408	3461.2	207.1	20.2
318.0	591271	199338	-388	3468.5	200.8	20.5
319.0	594743	199536	-367	3475.7	194.4	20.7
320.0	598223	199727	-346	3483.1	188.1	20.9

TABLE VII (U)

TIME SEC	EARTH-FIXED-POSITION			EARTH-FIXED-VELOCITY		
	XE M	YE M	ZE M	DXE M/SEC	DYE M/SEC	DZE M/SEC
321.0	601709	199912	-325	3490.4	181.8	21.2
322.0	605203	200091	-304	3497.8	175.4	21.4
323.0	608705	200263	-282	3505.2	169.1	21.7
324.0	612214	200429	-261	3512.5	162.8	21.9
325.0	615730	200588	-239	3519.9	156.4	22.1
326.0	619254	200742	-216	3527.4	150.0	22.4
327.0	622785	200888	-194	3534.8	143.7	22.7
328.0	626323	201029	-171	3542.3	137.3	22.9
329.0	629869	201163	-148	3549.8	131.0	23.2
330.0	633423	201291	-125	3557.3	124.6	23.4
331.0	636984	201412	-101	3564.8	118.2	23.7
332.0	640552	201527	-77	3572.3	111.8	23.9
333.0	644128	201636	-53	3579.9	105.5	24.2
334.0	647712	201738	-29	3587.4	99.1	24.4
335.0	651303	201834	-4	3595.1	92.7	24.7
336.0	654902	201924	19	3602.7	86.3	24.9
337.0	658509	202007	44	3610.3	79.9	25.2
338.0	662123	202084	70	3617.9	73.5	25.4
339.0	665744	202154	95	3625.6	67.1	25.7
340.0	669374	202218	121	3633.2	60.7	26.0
341.0	673011	202275	147	3640.8	54.3	26.2
342.0	676656	202326	174	3648.5	47.9	26.5
343.0	680308	202371	200	3656.2	41.4	26.7
344.0	683968	202409	227	3663.9	35.0	27.0
345.0	687636	202441	254	3671.7	28.6	27.2
346.0	691311	202466	282	3679.4	22.1	27.5
347.0	694995	202485	309	3687.2	15.7	27.8
348.0	698686	202498	337	3695.0	9.2	28.0
349.0	702385	202504	365	3702.8	2.7	28.3
350.0	706091	202503	394	3710.7	-3.8	28.6
351.0	709806	202496	422	3718.5	-10.2	28.8
352.0	713528	202483	451	3726.4	-16.7	29.1
353.0	717259	202463	481	3734.3	-23.2	29.4
354.0	720997	202436	510	3742.2	-29.7	29.6
355.0	724743	202403	540	3750.1	-36.2	29.9
356.0	728497	202364	570	3758.0	-42.7	30.1
357.0	732259	202318	600	3766.0	-49.3	30.4
358.0	736029	202265	631	3774.0	-55.8	30.7
359.0	739807	202206	661	3782.0	-62.3	30.9
360.0	743593	202141	692	3790.0	-68.8	31.2

TABLE VII (U)

TIME SEC	EARTH-FIXED-POSITION			EARTH-FIXED-VELOCITY		
	XE M	YE M	ZE M	DXE M/SEC	DYE M/SEC	DZE M/SEC
361.0	747387	202069	724	3798.1	-75.3	31.5
362.0	751189	201990	755	3806.2	-81.8	31.8
363.0	755000	201905	787	3814.3	-88.3	32.0
364.0	758818	201814	820	3822.4	-94.9	32.3
365.0	762644	201715	852	3830.5	-101.5	32.6
366.0	766479	201611	885	3838.6	-108.0	32.9
367.0	770322	201499	918	3846.8	-114.6	33.1
368.0	774172	201382	951	3854.9	-121.1	33.4
369.0	778031	201257	985	3863.1	-127.7	33.7
370.0	781899	201126	1018	3871.3	-134.3	34.0
371.0	785774	200989	1053	3879.5	-140.9	34.3
372.0	789658	200844	1087	3887.7	-147.5	34.5
373.0	793549	200694	1122	3896.0	-154.1	34.8
374.0	797450	200536	1157	3904.3	-160.8	35.1
375.0	801358	200372	1192	3912.5	-167.4	35.4
376.0	805275	200201	1227	3920.8	-174.0	35.6
377.0	809200	200024	1263	3929.2	-180.7	35.9
378.0	813133	199840	1299	3937.5	-187.3	36.2
379.0	817075	199649	1335	3945.8	-194.0	36.5
380.0	821025	199452	1372	3954.2	-200.7	36.7
381.0	824983	199248	1409	3962.6	-207.4	37.0
382.0	828950	199037	1446	3971.0	-214.1	37.3
383.0	832925	198820	1483	3979.5	-220.8	37.6
384.0	836909	198596	1521	3987.9	-227.5	37.9
385.0	840901	198365	1559	3996.4	-234.2	38.2
386.0	844902	198127	1597	4004.9	-241.0	38.5
387.0	848911	197883	1636	4013.4	-247.7	38.8
388.0	852928	197632	1675	4021.9	-254.5	39.1
389.0	856954	197374	1714	4030.5	-261.2	39.4
390.0	860989	197109	1754	4039.1	-268.0	39.7
391.0	865033	196838	1794	4047.7	-274.8	40.0
392.0	869085	196560	1834	4056.3	-281.6	40.3
393.0	873145	196275	1874	4064.9	-288.4	40.6
394.0	877214	195983	1915	4073.6	-295.2	40.9
395.0	881292	195684	1956	4082.3	-302.0	41.2
396.0	885379	195379	1997	4091.1	-308.8	41.5
397.0	889475	195066	2039	4099.8	-315.6	41.8
398.0	893579	194747	2081	4108.6	-322.4	42.0
399.0	897692	194422	2123	4117.4	-329.3	42.3
400.0	901814	194089	2166	4126.2	-336.1	42.6

TABLE VII (U)

TIME SEC	EARTH-FIXED-POSITION			EARTH-FIXED-VELOCITY		
	XE M	YE M	ZE M	DXE M/SEC	DYE M/SEC	DZE M/SEC
401.0	905944	193749	2208	4135.0	-343.0	42.9
402.0	910083	193403	2251	4143.8	-349.8	43.2
403.0	914232	193050	2295	4152.6	-356.7	43.5
404.0	918389	192690	2338	4161.5	-363.6	43.8
405.0	922555	192323	2382	4170.5	-370.5	44.1
406.0	926730	191949	2427	4179.4	-377.4	44.4
407.0	930914	191568	2471	4188.3	-384.3	44.7
408.0	935106	191180	2516	4197.3	-391.2	45.0
409.0	939308	190785	2561	4206.2	-398.1	45.3
410.0	943519	190384	2607	4215.2	-405.0	45.6
411.0	947739	189975	2652	4224.2	-411.9	45.9
412.0	951967	189560	2698	4233.3	-418.9	46.2
413.0	956205	189138	2745	4242.4	-425.8	46.5
414.0	960452	188708	2791	4251.6	-432.8	46.8
415.0	964708	188272	2838	4260.7	-439.8	47.1
416.0	968974	187829	2885	4269.9	-446.8	47.4
417.0	973248	187378	2933	4279.0	-453.8	47.7
418.0	977532	186921	2981	4288.3	-460.8	48.0
419.0	981825	186457	3029	4297.5	-467.9	48.3
420.0	986127	185985	3077	4306.8	-474.9	48.7
421.0	990438	185507	3126	4316.1	-481.9	49.0
422.0	994759	185022	3175	4325.4	-489.0	49.3
423.0	999089	184529	3225	4334.8	-496.0	49.6
424.0	1003429	184029	3275	4344.2	-503.1	49.9
425.0	1007777	183523	3325	4353.6	-510.2	50.2
426.0	1012136	183009	3375	4363.0	-517.2	50.6
427.0	1016504	182488	3426	4372.5	-524.3	50.9
428.0	1020881	181961	3477	4382.0	-531.4	51.2
429.0	1025267	181426	3528	4391.4	-538.5	51.5
430.0	1029664	180883	3580	4400.9	-545.7	51.8
431.0	1034069	180334	3632	4410.5	-552.9	52.1
432.0	1038485	179778	3684	4420.0	-560.0	52.5
433.0	1042909	179214	3737	4429.6	-567.2	52.8
434.0	1047344	178643	3790	4439.2	-574.3	53.1
435.0	1051788	178065	3843	4448.8	-581.5	53.4
436.0	1056241	177480	3897	4458.5	-588.7	53.8
437.0	1060705	176888	3951	4468.1	-595.9	54.1
438.0	1065178	176288	4005	4477.8	-603.2	54.4
439.0	1069660	175682	4059	4487.5	-610.4	54.7
440.0	1074153	175068	4114	4497.2	-617.6	55.1

TABLE VII (U)

TIME SEC	EARTH-FIXED-POSITION			EARTH-FIXED-VELOCITY		
	X <sub>E</sub> M	Y <sub>E</sub> M	Z <sub>E</sub> M	D <sub>X</sub> <sub>E</sub> M/SEC	D <sub>Y</sub> <sub>E</sub> M/SEC	D <sub>Z</sub> <sub>E</sub> M/SEC
441.0	1078655	174446	4170	4507.0	-624.9	55.4
442.0	1083167	173818	4225	4516.8	-632.1	55.7
443.0	1087688	173182	4281	4526.7	-639.4	56.1
444.0	1092220	172539	4337	4536.6	-646.7	56.4
445.0	1096761	171889	4394	4546.5	-654.0	56.7
446.0	1101313	171231	4451	4556.4	-661.3	57.0
447.0	1105874	170566	4508	4566.4	-668.6	57.4
448.0	1110446	169894	4565	4576.4	-676.0	57.7
449.0	1115027	169214	4623	4586.4	-683.3	58.0
450.0	1119619	168527	4681	4596.5	-690.7	58.4
451.0	1124220	167833	4740	4606.5	-698.1	58.7
452.0	1128832	167131	4799	4616.6	-705.5	59.1
453.0	1133453	166422	4858	4626.8	-712.9	59.4
454.0	1138085	165705	4918	4636.9	-720.3	59.7
455.0	1142727	164981	4978	4647.1	-727.7	60.1
456.0	1147379	164250	5038	4657.3	-735.2	60.4
457.0	1152042	163511	5098	4667.5	-742.7	60.7
458.0	1156714	162765	5159	4677.8	-750.1	61.1
459.0	1161397	162011	5220	4688.1	-757.6	61.4
460.0	1166091	161249	5282	4698.4	-765.2	61.8
461.0	1170794	160480	5344	4708.7	-772.7	62.1
462.0	1175508	159704	5406	4719.1	-780.2	62.4
463.0	1180232	158920	5469	4729.5	-787.7	62.8
464.0	1184967	158128	5532	4739.9	-795.3	63.1
465.0	1189712	157329	5595	4750.3	-802.8	63.5
466.0	1194468	156523	5659	4760.7	-810.4	63.8
467.0	1199234	155709	5723	4771.3	-818.0	64.2
468.0	1204010	154887	5787	4781.8	-825.6	64.5
469.0	1208797	154057	5852	4792.4	-833.2	64.9
470.0	1213595	153220	5917	4803.0	-840.8	65.2
471.0	1218403	152376	5982	4813.6	-848.5	65.6
472.0	1223222	151523	6048	4824.3	-856.1	65.9
473.0	1228052	150663	6114	4835.0	-863.8	66.3
474.0	1232892	149796	6181	4845.7	-871.5	66.6
475.0	1237743	148920	6247	4856.5	-879.2	67.0
476.0	1242605	148037	6315	4867.2	-887.0	67.3
477.0	1247478	147146	6382	4878.1	-894.7	67.7
478.0	1252361	146248	6450	4888.9	-902.5	68.1
479.0	1257256	145341	6518	4899.8	-910.3	68.4
480.0	1262161	144427	6587	4910.7	-918.1	68.8

TABLE VII (U)

TIME SEC	EARTH-FIXED-POSITION			EARTH-FIXED-VELOCITY		
	XE M	YE M	ZE M	DXE M/SEC	DYE M/SEC	DZE M/SEC
481.0	1267077	143505	6656	4921.6	-925.9	69.1
482.0	1272004	142575	6725	4932.6	-933.7	69.5
483.0	1276942	141638	6795	4943.6	-941.6	69.9
484.0	1281891	140692	6865	4954.7	-949.4	70.2
485.0	1286852	139739	6935	4965.8	-957.3	70.6
486.0	1291823	138778	7006	4976.9	-965.2	70.9
487.0	1296805	137809	7077	4988.1	-973.1	71.3
488.0	1301799	136832	7149	4999.2	-981.0	71.7
489.0	1306804	135847	7220	5010.5	-989.0	72.0
490.0	1311820	134854	7293	5021.7	-997.0	72.4
491.0	1316847	133853	7365	5033.0	-1005.0	72.8
492.0	1321886	132843	7438	5044.4	-1013.0	73.2
493.0	1326936	131826	7512	5055.7	-1021.1	73.6
494.0	1331998	130801	7585	5067.1	-1029.1	73.9
495.0	1337070	129768	7659	5078.5	-1037.1	74.3
496.0	1342155	128727	7734	5090.0	-1045.2	74.7
497.0	1347250	127678	7809	5101.5	-1053.3	75.0
498.0	1352358	126620	7884	5113.1	-1061.5	75.4
499.0	1357477	125555	7960	5124.7	-1069.6	75.8
500.0	1362607	124481	8036	5136.3	-1077.8	76.2
501.0	1367749	123399	8112	5148.0	-1086.0	76.5
502.0	1372903	122309	8189	5159.7	-1094.1	76.9
503.0	1378069	121211	8266	5171.4	-1102.3	77.3
504.0	1383246	120104	8343	5183.2	-1110.5	77.7
505.0	1388435	118990	8421	5195.0	-1118.8	78.0
506.0	1393636	117867	8499	5206.9	-1127.0	78.4
507.0	1398849	116736	8578	5218.8	-1135.3	78.8
508.0	1404073	115596	8657	5230.6	-1143.6	79.2
509.0	1409310	114448	8736	5242.6	-1152.0	79.5
510.0	1414559	113292	8816	5254.6	-1160.3	79.9
511.0	1419819	112128	8896	5266.6	-1168.6	80.3
512.0	1425092	110955	8977	5278.7	-1177.0	80.7
513.0	1430377	109774	9058	5290.8	-1185.4	81.1
514.0	1435673	108584	9139	5303.0	-1193.8	81.5
515.0	1440983	107386	9220	5315.3	-1202.2	81.9
516.0	1446304	106180	9303	5327.5	-1210.7	82.2
517.0	1451638	104965	9385	5339.8	-1219.2	82.6
518.0	1456984	103741	9468	5352.1	-1227.7	83.0
519.0	1462342	102510	9551	5364.5	-1236.2	83.4
520.0	1467713	101269	9635	5377.0	-1244.7	83.8

TABLE VII (U)

TIME SEC	EARTH-FIXED-POSITION			EARTH-FIXED-VELOCITY		
	XE M	YE M	ZE M	DXE M/SEC	DYE M/SEC	DZE M/SEC
521.0	1473096	100020	9719	5389.4	-1253.3	84.2
522.0	1478492	98762	9803	5402.0	-1261.9	84.6
523.0	1483900	97496	9888	5414.5	-1270.6	85.0
524.0	1489321	96221	9973	5427.1	-1279.2	85.4
525.0	1494754	94938	10058	5439.7	-1287.9	85.8
526.0	1500200	93646	10144	5452.4	-1296.5	86.2
527.0	1505659	92345	10231	5465.1	-1305.2	86.6
528.0	1511130	91035	10318	5477.8	-1313.9	87.0
529.0	1516614	89717	10405	5490.6	-1322.7	87.3
530.0	1522111	88390	10492	5503.4	-1331.4	87.7
531.0	1527621	87054	10580	5516.4	-1340.3	88.1
532.0	1533144	85709	10668	5529.3	-1349.1	88.5
533.0	1538680	84356	10757	5542.3	-1357.9	88.9
534.0	1544229	82993	10846	5555.3	-1366.8	89.3
535.0	1549791	81622	10936	5568.4	-1375.6	89.8
536.0	1555366	80242	11026	5581.5	-1384.6	90.2
537.0	1560954	78853	11116	5594.7	-1393.5	90.6
538.0	1566555	77455	11207	5607.9	-1402.5	91.0
539.0	1572170	76048	11298	5621.2	-1411.4	91.4
540.0	1577797	74632	11390	5634.5	-1420.5	91.8
541.0	1583439	73207	11482	5647.9	-1429.5	92.2
542.0	1589093	71773	11574	5661.3	-1438.6	92.6
543.0	1594761	70330	11667	5674.8	-1447.7	93.0
544.0	1600443	68878	11760	5688.4	-1456.9	93.4
545.0	1606138	67416	11854	5701.9	-1466.0	93.8
546.0	1611847	65946	11948	5715.6	-1475.2	94.3
547.0	1617569	64466	12042	5729.2	-1484.3	94.7
548.0	1623305	62977	12137	5743.0	-1493.5	95.1
549.0	1629055	61479	12233	5756.8	-1502.7	95.5
550.0	1634819	59972	12328	5770.6	-1511.9	96.0
551.0	1640596	58455	12424	5784.5	-1521.2	96.4
552.0	1646388	56929	12521	5798.5	-1530.6	96.8
553.0	1652193	55394	12618	5812.5	-1539.9	97.2
554.0	1658013	53849	12716	5826.6	-1549.3	97.6
555.0	1663847	52295	12813	5840.7	-1558.7	98.1
556.0	1669694	50732	12912	5854.9	-1568.2	98.5
557.0	1675556	49159	13010	5869.1	-1577.6	99.0
558.0	1681433	47577	13110	5883.4	-1587.1	99.4
559.0	1687323	45985	13209	5897.7	-1596.6	99.8
560.0	1693228	44383	13309	5912.1	-1606.2	100.3

TABLE VII (U)

TIME SEC	EARTH-FIXED-POSITION			EARTH-FIXED-VELOCITY		
	XE M	YE M	ZE M	DXE M/SEC	DYE M/SEC	DZE M/SEC
561.0	1699147	42772	13410	5926.6	-1615.8	100.7
562.0	1705081	41152	13511	5941.1	-1625.4	101.2
563.0	1711030	39521	13612	5955.7	-1635.0	101.6
564.0	1716993	37882	13714	5970.3	-1644.7	102.1
565.0	1722970	36232	13816	5985.0	-1654.4	102.5
566.0	1728963	34573	13919	5999.8	-1664.2	102.9
567.0	1734970	32904	14022	6014.6	-1673.9	103.4
568.0	1740992	31225	14126	6029.5	-1683.8	103.8
569.0	1747029	29536	14230	6044.4	-1693.6	104.3
570.0	1753081	27838	14334	6059.4	-1703.5	104.7
571.0	1759148	26129	14439	6074.5	-1713.4	105.1
572.0	1765230	24411	14545	6089.6	-1723.4	105.6
573.0	1771327	22682	14650	6104.8	-1733.4	106.0
574.0	1777439	20944	14757	6120.0	-1743.3	106.5
575.0	1783567	19196	14863	6135.4	-1753.4	107.0
576.0	1789710	17437	14971	6150.7	-1763.4	107.4
577.0	1795868	15669	15078	6166.2	-1773.5	107.9
578.0	1802042	13890	15186	6181.7	-1783.7	108.3
579.0	1808232	12102	15295	6197.3	-1793.9	108.8
580.0	1814437	10303	15404	6213.0	-1804.1	109.2
581.0	1820658	8493	15513	6228.7	-1814.4	109.7
582.0	1826894	6674	15623	6244.5	-1824.7	110.2
583.0	1833147	4844	15734	6260.3	-1835.1	110.7
584.0	1839415	3003	15845	6276.3	-1845.5	111.2
585.0	1845699	1153	15956	6292.2	-1856.0	111.7
586.0	1852000	-708	16068	6308.2	-1866.5	112.2
587.0	1858316	-2579	16180	6324.3	-1877.1	112.7
588.0	1864648	-4462	16293	6340.4	-1887.8	113.1
589.0	1870997	-6355	16407	6356.7	-1898.5	113.6
590.0	1877362	-8259	16521	6373.0	-1909.2	114.1
591.0	1883743	-10173	16635	6389.4	-1920.1	114.6
592.0	1890140	-12099	16750	6405.8	-1930.9	115.1
593.0	1896554	-14035	16865	6422.3	-1941.8	115.5
594.0	1902985	-15983	16981	6438.9	-1952.8	116.0
595.0	1909432	-17941	17097	6455.5	-1963.8	116.5
596.0	1915896	-19910	17214	6472.2	-1974.9	117.0
597.0	1922377	-21891	17331	6489.0	-1986.0	117.5
598.0	1928874	-23882	17449	6505.9	-1997.2	117.9
599.0	1935388	-25885	17567	6522.8	-2008.5	118.4
600.0	1941920	-27899	17686	6539.9	-2019.9	118.9

TABLE VII (U)

TIME SEC	EARTH-FIXED-POSITION			EARTH-FIXED-VELOCITY		
	XE M	YE M	ZE M	DXE M/SEC	DYE M/SEC	DZE M/SEC
601.0	1948468	-29925	17805	6557.0	-2031.3	119.4
602.0	1955034	-31962	17925	6574.2	-2042.8	119.9
603.0	1961617	-34010	18045	6591.4	-2054.3	120.4
604.0	1968217	-36071	18165	6608.7	-2065.9	120.9
605.0	1974834	-38142	18287	6626.1	-2077.5	121.4
606.0	1981469	-40226	18408	6643.5	-2089.2	121.9
607.0	1988121	-42321	18530	6661.0	-2100.9	122.3
608.0	1994791	-44428	18653	6678.6	-2112.7	122.8
609.0	2001478	-46546	18776	6696.3	-2124.6	123.3
610.0	2008184	-48677	18899	6714.1	-2136.5	123.7
611.0	2014907	-50819	19023	6731.9	-2148.4	124.2
612.0	2021647	-52974	19148	6749.8	-2160.5	124.7
613.0	2028406	-55140	19273	6767.7	-2172.6	125.2
614.0	2035183	-57319	19398	6785.8	-2184.8	125.6
615.0	2041978	-59510	19524	6803.9	-2197.0	126.1
616.0	2048791	-61713	19650	6822.2	-2209.3	126.6
617.0	2055622	-63928	19777	6840.5	-2222.0	127.1
618.0	2062472	-66156	19905	6858.9	-2234.0	127.5
619.0	2069340	-68397	20032	6877.4	-2246.3	128.0
620.0	2076227	-70649	20161	6896.0	-2258.9	128.5
621.0	2083132	-72914	20289	6914.7	-2271.8	129.0
622.0	2090056	-75193	20418	6933.4	-2284.8	129.5
623.0	2096999	-77484	20548	6952.3	-2297.5	129.9
624.0	2103960	-79788	20678	6971.2	-2310.3	130.4
625.0	2110941	-82106	20809	6990.3	-2323.4	130.9
626.0	2117941	-84436	20940	7009.5	-2336.5	131.4
627.0	2124961	-86780	21072	7028.7	-2349.5	131.9
628.0	2132002	-89136	21204	7048.1	-2362.7	132.4
629.0	2139061	-91506	21337	7067.4	-2376.1	132.8
S-IV CUTOFF SIGNAL						
629.970	2145921	-93816	21466	7085.6	-2388.8	133.3
630.0	2146133	-93888	21470	7086.1	-2389.2	133.3
631.0	2153215	-96279	21603	7084.8	-2396.4	133.7
632.0	2160299	-98680	21737	7082.1	-2404.0	134.1
633.0	2167382	-101088	21871	7079.5	-2411.6	134.5
634.0	2174461	-103504	22006	7076.8	-2419.5	134.8
635.0	2181537	-105927	22141	7074.2	-2427.0	135.2

TABLE VII (U)

TIME SEC	EARTH-FIXED-POSITION			EARTH-FIXED-VELOCITY		
	XE M	YE M	ZE M	DXE M/SEC	DYE M/SEC	DZE M/SEC
636.0	2188610	-108358	22276	7071.5	-2434.7	135.6
637.0	2195680	-110797	22412	7068.8	-2442.3	136.0
638.0	2202747	-113243	22548	7066.1	-2450.0	136.3
639.0	2209812	-115697	22685	7063.4	-2457.6	136.7
INSERTION						
639.970	2216662	-118084	22818	7060.7	-2465.0	137.1

TABLE VIII (U)

TIME SEC	SPACE-FIXED-POSITION			SPACE-FIXED-VELOCITY		
	XS M	YS M	ZS M	DXS M/SEC	DYS M/SEC	DZS M/SEC
<b>FIRST MOTION</b>						
0.310	0	32	0	395.0	-0.0	-105.8
<b>LIFTOFF SIGNAL</b>						
0.410	39	32	-10	395.0	0.3	-105.9
1.0	273	33	-72	395.1	2.3	-105.9
2.0	668	37	-178	395.1	5.6	-106.0
3.0	1063	44	-284	395.0	9.0	-106.0
4.0	1458	55	-390	395.0	12.5	-106.1
5.0	1853	69	-496	394.9	16.0	-106.1
6.0	2247	87	-602	394.9	19.7	-106.2
7.0	2642	108	-709	394.8	23.4	-106.2
8.0	3037	133	-815	394.8	27.3	-106.2
9.0	3432	163	-921	394.8	31.2	-106.2
10.0	3827	196	-1027	394.7	35.2	-106.2
11.0	4221	233	-1134	394.7	39.3	-106.2
12.0	4616	274	-1240	394.6	43.5	-106.1
13.0	5011	320	-1346	394.5	47.9	-106.1
14.0	5405	370	-1452	394.5	52.3	-106.0
15.0	5800	425	-1558	394.4	56.8	-105.9
16.0	6194	484	-1664	394.4	61.4	-105.9
17.0	6588	547	-1770	394.5	66.1	-105.8
18.0	6983	616	-1875	394.7	70.9	-105.7
19.0	7377	689	-1981	395.1	75.8	-105.5
20.0	7772	767	-2087	395.6	80.8	-105.4
21.0	8168	851	-2192	396.3	85.9	-105.3
22.0	8564	939	-2297	397.2	91.1	-105.2
23.0	8962	1033	-2402	398.4	96.3	-105.1
24.0	9361	1132	-2507	399.9	101.5	-105.0
25.0	9761	1236	-2612	401.5	106.8	-104.9
26.0	10164	1346	-2717	403.5	112.1	-104.8
27.0	10568	1460	-2822	405.7	117.5	-104.7
28.0	10975	1580	-2926	408.2	122.8	-104.6
29.0	11384	1706	-3031	410.9	128.3	-104.4
30.0	11796	1837	-3135	413.8	133.9	-104.2

TABLE VIII (U)

TIME SEC	SPACE-FIXED-POSITION			SPACE-FIXED-VELOCITY		
	XS M	YS M	ZS M	DXS M/SEC	DYS M/SEC	DZS M/SEC
31.0	12211	1974	-3239	417.0	139.5	-104.1
32.0	12630	2116	-3343	420.5	145.2	-103.9
33.0	13052	2264	-3447	424.1	151.0	-103.8
34.0	13477	2418	-3551	428.1	156.8	-103.8
35.0	13907	2578	-3654	432.3	162.7	-103.7
36.0	14342	2744	-3758	436.6	168.6	-103.7
37.0	14780	2915	-3862	441.1	174.6	-103.8
38.0	15223	3093	-3965	445.8	180.6	-103.8
39.0	15671	3276	-4069	450.6	186.7	-103.8
40.0	16124	3466	-4173	455.5	192.8	-103.9
41.0	16582	3662	-4277	460.6	199.1	-103.9
42.0	17045	3865	-4381	465.9	205.5	-104.0
43.0	17514	4073	-4485	471.2	211.9	-104.1
44.0	17987	4289	-4589	476.6	218.4	-104.3
45.0	18467	4510	-4693	482.1	225.0	-104.5
46.0	18952	4739	-4798	487.8	231.7	-104.6
47.0	19442	4974	-4903	493.5	238.5	-104.8
48.0	19938	5216	-5007	499.4	245.4	-104.9
49.0	20441	5465	-5112	505.4	252.3	-105.0
50.0	20949	5720	-5217	511.6	259.3	-105.1
51.0	21464	5983	-5322	518.1	266.3	-105.3
52.0	21985	6253	-5428	524.7	273.3	-105.6
53.0	22513	6530	-5534	531.6	280.3	-105.8
54.0	23048	6814	-5639	538.6	287.1	-106.1
MACH ØNE						
54.693	23422	7014	-5713	543.6	291.8	-106.2
55.0	23590	7104	-5746	545.8	293.9	-106.3
56.0	24139	7402	-5852	553.2	300.4	-106.5
57.0	24696	7705	-5959	560.7	306.8	-106.8
58.0	25260	8015	-6066	568.3	313.2	-107.2
59.0	25832	8332	-6173	576.1	319.7	-107.5
60.0	26412	8655	-6281	584.2	326.2	-107.9
61.0	27000	8985	-6389	592.6	332.9	-108.2
62.0	27597	9321	-6497	601.3	339.6	-108.5
63.0	28203	9664	-6606	610.4	346.5	-108.9
64.0	28817	10014	-6715	619.7	353.5	-109.5
65.0	29442	10371	-6825	629.2	360.6	-110.2

TABLE VIII (U)

TIME SEC	SPACE-FIXED-POSITION			SPACE-FIXED-VELOCITY		
	XS M	YS M	ZS M	DXS M/SEC	DYS M/SEC	DZS M/SEC
66.0	30076	10735	-6935	639.0	367.9	-111.0
67.0	30720	11107	-7046	649.0	375.4	-111.7
68.0	31373	11486	-7159	659.3	383.1	-112.5
69.0	32037	11873	-7272	669.9	390.9	-113.1
MAXIMUM DYNAMIC PRESSURE						
69.210	32178	11955	-7296	672.2	392.6	-113.2
70.0	32711	12267	-7387	680.8	398.9	-113.6
71.0	33396	12669	-7501	692.1	407.0	-114.1
72.0	34093	13079	-7617	703.7	415.2	-114.5
73.0	34803	13498	-7731	715.7	423.5	-114.9
74.0	35525	13926	-7846	728.0	431.9	-115.4
75.0	36259	14363	-7962	740.8	440.5	-115.8
76.0	37006	14808	-8078	754.0	449.1	-116.3
77.0	37767	15261	-8195	767.7	457.8	-116.8
78.0	38541	15724	-8312	781.8	466.6	-117.2
79.0	39330	16195	-8429	796.3	475.5	-117.4
80.0	40134	16675	-8546	811.3	484.6	-117.5
81.0	40952	17165	-8664	826.5	493.7	-117.8
82.0	41787	17663	-8782	842.2	503.0	-118.0
83.0	42637	18171	-8900	858.4	512.3	-118.4
84.0	43503	18688	-9018	875.0	521.7	-118.7
85.0	44387	19215	-9137	892.2	531.2	-118.9
86.0	45288	19751	-9256	909.8	540.8	-119.1
87.0	46206	20297	-9375	927.7	550.5	-119.2
88.0	47143	20852	-9495	946.1	560.3	-119.4
89.0	48098	21418	-9614	964.8	570.3	-119.7
90.0	49073	21993	-9734	983.9	580.4	-119.8
91.0	50066	22579	-9854	1003.6	590.6	-119.9
92.0	51080	23175	-9974	1023.7	600.8	-120.0
93.0	52114	23781	-10094	1044.3	611.1	-120.1
94.0	53168	24397	-10214	1065.1	621.6	-120.3
95.0	54244	25024	-10334	1086.4	632.1	-120.6
96.0	55341	25662	-10455	1108.1	642.7	-120.8
97.0	56460	26310	-10576	1130.3	653.4	-121.1
98.0	57602	26969	-10697	1153.1	664.2	-121.2
99.0	58766	27639	-10818	1176.4	675.0	-121.2
100.0	59955	28319	-10939	1200.2	685.9	-121.2

TABLE VIII (U)

TIME SEC	SPACE-FIXED-POSITION			SPACE-FIXED-VELOCITY		
	XS M	YS M	ZS M	DXS M/SEC	DYS M/SEC	DZS M/SEC
101.0	61167	29011	-11061	1224.3	696.9	-121.4
102.0	62403	29713	-11182	1248.7	708.0	-121.6
103.0	63664	30427	-11304	1273.6	719.2	-122.0
104.0	64951	31152	-11426	1298.9	730.6	-122.4
105.0	66262	31889	-11549	1324.6	741.9	-122.9
106.0	67600	32637	-11672	1351.0	753.4	-123.2
107.0	68964	33396	-11795	1377.9	764.9	-123.5
108.0	70356	34167	-11919	1405.3	776.5	-123.8
109.0	71775	34949	-12043	1433.2	788.2	-124.2
110.0	73223	35744	-12167	1461.6	800.0	-124.5
111.0	74699	36550	-12292	1490.6	811.9	-124.8
112.0	76204	37368	-12417	1520.0	823.8	-125.3
113.0	77739	38198	-12542	1550.0	835.8	-125.8
114.0	79304	39040	-12669	1580.6	847.9	-126.4
115.0	80900	39894	-12795	1611.8	859.9	-126.9
116.0	82528	40760	-12922	1643.6	872.0	-127.4
117.0	84188	41638	-13050	1676.0	884.1	-127.9
118.0	85880	42529	-13178	1709.1	896.3	-128.3
119.0	87606	43431	-13307	1742.7	908.6	-128.8
120.0	89366	44346	-13436	1777.1	920.8	-129.3
121.0	91161	45274	-13565	1812.1	933.2	-129.8
122.0	92991	46213	-13695	1847.8	945.5	-130.3
123.0	94857	47165	-13826	1884.2	957.9	-130.8
124.0	96760	48129	-13957	1921.4	970.3	-131.3
125.0	98700	49106	-14089	1959.3	982.8	-131.7
126.0	100679	50095	-14221	1997.9	995.3	-132.2
127.0	102696	51097	-14353	2037.4	1007.8	-132.7
128.0	104754	52112	-14486	2077.6	1020.3	-133.1
129.0	106852	53138	-14619	2118.7	1032.9	-133.6
130.0	108992	54178	-14753	2160.7	1045.4	-134.0
131.0	111174	55230	-14888	2203.4	1058.1	-134.5
132.0	113399	56294	-15022	2247.0	1071.0	-135.0
133.0	115669	57372	-15158	2291.5	1084.0	-135.6
134.0	117983	58463	-15293	2336.7	1097.4	-136.1
135.0	120343	59567	-15430	2382.8	1111.2	-136.7
136.0	122749	60685	-15567	2429.2	1125.4	-137.2
137.0	125203	61818	-15704	2477.1	1140.0	-137.7
138.0	127706	62966	-15842	2525.7	1155.3	-138.3
139.0	130259	64131	-15981	2575.2	1170.9	-138.8
140.0	132861	65310	-16120	2625.7	1187.0	-139.4

TABLE VIII (U)

TIME SEC	SPACE-FIXED-POSITION			SPACE-FIXED-VELOCITY		
	XS M	YS M	ZS M	DXS M/SEC	DYS M/SEC	DZS M/SEC
IECØ SIGNAL						
140.750	134860	66160	-16226	2663.7	1199.5	-139.7
141.0	135506	66502	-16259	2676.4	1203.3	-139.8
142.0	138192	67704	-16399	2703.2	1207.5	-140.1
143.0	140910	68914	-16540	2729.7	1211.4	-140.4
144.0	143656	70128	-16681	2755.8	1215.4	-140.7
145.0	146429	71347	-16821	2782.0	1219.0	-140.9
146.0	149227	72571	-16960	2808.6	1223.1	-141.2
ØECØ SIGNAL						
146.730	151290	73416	-17065	2828.2	1226.2	-141.4
147.0	152046	73796	-17101	2834.5	1227.0	-141.4
SEPARATION SIGNAL						
147.140	152441	73967	-17120	2834.7	1225.9	-141.5
148.0	154888	75023	-17243	2835.9	1218.3	-141.5
S-IV IGNITION SIGNAL						
148.840	157272	76043	-17363	2836.5	1210.3	-141.5
149.0	157726	76237	-17385	2836.6	1208.8	-141.5
150.0	160565	77441	-17528	2837.5	1199.7	-141.5
151.0	163404	78634	-17671	2840.8	1192.0	-141.6
152.0	166246	79821	-17813	2846.5	1185.4	-141.8
153.0	169094	81003	-17953	2852.0	1178.9	-141.8
154.0	171948	82179	18095	2857.4	1172.4	-141.9
155.0	174808	83348	-18237	2863.3	1165.6	-141.9
156.0	177674	84510	-18379	2868.6	1158.7	-142.0
157.0	180545	85665	-18521	2874.0	1152.2	-142.1
158.0	183422	86814	-18663	2879.5	1145.7	-142.1
159.0	186304	87957	-18805	2885.0	1139.1	-142.2
160.0	189192	89092	-18947	2890.5	1132.5	-142.3

TABLE VIII (U)

TIME SEC	SPACE-FIXED-POSITION			SPACE-FIXED-VELOCITY		
	XS M	YS M	ZS M	DXS M/SEC	DYS M/SEC	DZS M/SEC
161.0	192085	90221	-19090	2896.1	1125.9	-142.3
162.0	194984	91344	-19232	2901.6	1119.3	-142.4
163.0	197888	92460	-19374	2907.2	1112.8	-142.5
164.0	200798	93570	-19517	2912.7	1106.3	-142.6
165.0	203714	94673	-19660	2918.2	1099.7	-142.6
166.0	206635	95769	-19802	2923.7	1093.2	-142.6
167.0	209561	96859	-19945	2929.3	1086.7	-142.7
168.0	212493	97943	-20088	2934.8	1080.3	-142.8
169.0	215431	99020	-20230	2940.3	1073.8	-142.8
170.0	218374	100090	-20373	2945.9	1067.3	-142.9
171.0	221323	101154	-20516	2951.5	1060.8	-143.0
172.0	224277	102212	-20659	2957.1	1054.3	-143.1
173.0	227237	103263	-20802	2962.7	1047.8	-143.2
174.0	230202	104307	-20946	2968.3	1041.3	-143.3
175.0	233173	105345	-21089	2973.9	1034.7	-143.4
176.0	236150	106377	-21232	2979.5	1028.3	-143.5
177.0	239132	107402	-21376	2985.1	1021.8	-143.6
178.0	242120	108420	-21520	2990.7	1015.3	-143.6
179.0	245114	109433	-21663	2996.3	1008.9	-143.6
180.0	248113	110438	-21807	3001.9	1002.4	-143.6
181.0	251117	111437	-21950	3007.6	995.8	-143.6
182.0	254128	112430	-22094	3013.3	989.3	-143.7
183.0	257144	113416	-22238	3018.9	982.8	-143.8
184.0	260166	114395	-22381	3024.6	976.3	-143.9
185.0	263193	115369	-22525	3030.2	969.9	-144.0
186.0	266226	116335	-22669	3035.8	963.5	-144.1
187.0	269265	117296	-22813	3041.5	957.1	-144.1
188.0	272309	118249	-22958	3047.2	950.6	-144.2
189.0	275359	119197	-23102	3052.9	944.1	-144.2
190.0	278415	120138	-23246	3058.5	937.7	-144.3
191.0	281476	121072	-23390	3064.2	931.3	-144.3
192.0	284543	122000	-23535	3069.9	924.8	-144.4
193.0	287616	122922	-23679	3075.7	918.3	-144.4
194.0	290695	123837	-23824	3081.4	911.8	-144.6
195.0	293779	124745	-23968	3087.2	905.3	-144.7
196.0	296869	125647	-24113	3092.9	898.8	-144.8
197.0	299965	126543	-24258	3098.7	892.3	-144.8
198.0	303066	127432	-24403	3104.5	885.8	-144.9
199.0	306174	128315	-24548	3110.4	879.2	-145.0
200.0	309287	129190	-24693	3116.2	872.6	-145.1

TABLE VIII (U)

TIME SEC	SPACE-FIXED-POSITION			SPACE-FIXED-VELOCITY		
	XS M	YS M	ZS M	DXS M/SEC	DYS M/SEC	DZS M/SEC
201.0	312406	130060	-24838	3122.1	866.0	-145.2
202.0	315531	130922	-24983	3127.9	859.6	-145.2
203.0	318662	131779	-25128	3133.6	853.2	-145.3
204.0	321798	132629	-25274	3139.4	846.8	-145.3
205.0	324941	133472	-25419	3145.2	840.3	-145.4
206.0	328089	134310	-25564	3151.1	833.8	-145.6
207.0	331243	135140	-25710	3156.9	827.3	-145.8
208.0	334403	135964	-25856	3162.8	820.7	-145.9
209.0	337568	136781	-26002	3168.8	814.1	-145.9
210.0	340740	137592	-26148	3174.6	807.7	-145.9
211.0	343918	138397	-26294	3180.5	801.2	-146.0
212.0	347101	139195	-26440	3186.4	794.7	-146.0
213.0	350290	139986	-26586	3192.3	788.2	-146.1
214.0	353486	140771	-26732	3198.2	781.7	-146.3
215.0	356687	141550	-26878	3204.1	775.2	-146.5
216.0	359894	142322	-27025	3210.1	768.7	-146.6
217.0	363107	143087	-27172	3216.1	762.1	-146.6
218.0	366326	143846	-27318	3222.1	755.6	-146.6
219.0	369552	144597	-27464	3228.1	749.1	-146.6
220.0	372784	145341	-27611	3234.2	742.7	-146.6
221.0	376022	146079	-27757	3240.3	736.2	-146.7
222.0	379267	146811	-27903	3246.3	729.8	-146.7
223.0	382516	147538	-28050	3252.4	723.3	-146.8
224.0	385772	148258	-28197	3258.4	716.8	-146.8
225.0	389033	148972	-28344	3264.5	710.2	-146.9
226.0	392301	149678	-28491	3270.6	703.7	-147.0
227.0	395574	150379	-28638	3276.6	697.1	-147.0
228.0	398854	151073	-28785	3282.7	690.6	-147.1
229.0	402140	151760	-28932	3288.8	684.0	-147.2
230.0	405432	152441	-29079	3295.0	677.5	-147.2
231.0	408730	153115	-29226	3301.1	670.9	-147.3
232.0	412034	153783	-29374	3307.2	664.4	-147.4
233.0	415344	154444	-29521	3313.3	657.8	-147.4
234.0	418660	155098	-29669	3319.4	651.3	-147.5
235.0	421983	155746	-29816	3325.6	644.8	-147.6
236.0	425311	156388	-29964	3331.8	638.2	-147.6
237.0	428646	157023	-30111	3338.0	631.7	-147.7
238.0	431987	157651	-30259	3344.2	625.1	-147.8
239.0	435335	158273	-30407	3350.4	618.6	-147.8
240.0	438688	158888	-30555	3356.7	612.0	-147.9

TABLE VIII (U)

TIME SEC	SPACE-FIXED-POSITION			SPACE-FIXED-VELOCITY		
	XS M	YS M	ZS M	DXS M/SEC	DYS M/SEC	DZS M/SEC
241.0	442048	159497	-30703	3362.9	605.5	-148.0
242.0	445414	160099	-30851	3369.2	598.9	-148.0
243.0	448786	160695	-30999	3375.4	592.4	-148.1
244.0	452165	161284	-31147	3381.7	585.8	-148.2
245.0	455550	161866	-31295	3388.0	579.2	-148.2
246.0	458941	162442	-31444	3394.3	572.6	-148.3
247.0	462338	163012	-31592	3400.6	566.0	-148.4
248.0	465742	163574	-31740	3406.9	559.4	-148.4
249.0	469152	164131	-31889	3413.2	552.8	-148.5
250.0	472568	164680	-32037	3419.5	546.2	-148.6
251.0	475991	165223	-32186	3425.9	539.6	-148.6
252.0	479420	165759	-32335	3432.2	533.0	-148.7
253.0	482856	166289	-32483	3438.6	526.4	-148.8
254.0	486297	166812	-32632	3445.0	519.8	-148.8
255.0	489746	167328	-32781	3451.4	513.2	-148.9
256.0	493200	167838	-32930	3457.7	506.5	-148.9
257.0	496661	168342	-33079	3464.1	499.9	-149.0
258.0	500128	168838	-33228	3470.5	493.2	-149.1
259.0	503602	169328	-33377	3476.9	486.6	-149.1
260.0	507082	169811	-33526	3483.3	479.9	-149.2
261.0	510569	170288	-33675	3489.8	473.3	-149.3
262.0	514062	170758	-33825	3496.2	466.6	-149.3
263.0	517561	171221	-33974	3502.7	460.0	-149.4
264.0	521067	171678	-34123	3509.2	453.3	-149.5
265.0	524580	172128	-34273	3515.7	446.6	-149.5
266.0	528098	172571	-34422	3522.2	440.0	-149.6
267.0	531624	173008	-34572	3528.7	433.3	-149.7
268.0	535156	173438	-34722	3535.2	426.6	-149.7
269.0	538694	173861	-34872	3541.7	419.9	-149.8
270.0	542239	174278	-35021	3548.3	413.2	-149.8
271.0	545791	174687	-35171	3554.9	406.6	-149.9
272.0	549349	175091	-35321	3561.5	399.9	-150.0
273.0	552914	175487	-35471	3568.1	393.2	-150.0
274.0	556485	175877	-35621	3574.7	386.5	-150.1
275.0	560063	176260	-35771	3581.3	379.8	-150.2
276.0	563648	176637	-35922	3588.0	373.1	-150.2
277.0	567239	177006	-36072	3594.6	366.3	-150.3
278.0	570837	177369	-36222	3601.2	359.6	-150.3
279.0	574442	177725	-36373	3607.9	352.9	-150.4
280.0	578053	178075	-36523	3614.5	346.2	-150.5

TABLE VIII (U)

TIME SEC	SPACE-FIXED-POSITION			SPACE-FIXED-VELOCITY		
	XS M	YS M	ZS M	DXS M/SEC	DYS M/SEC	DZS M/SEC
281.0	581670	178418	-36673	3621.1	339.5	-150.5
282.0	585295	178754	-36824	3627.7	332.7	-150.6
283.0	588926	179083	-36975	3634.3	326.0	-150.7
284.0	592563	179406	-37125	3640.9	319.2	-150.7
285.0	596208	179722	-37276	3647.6	312.5	-150.8
286.0	599859	180031	-37427	3654.3	305.7	-150.9
287.0	603516	180333	-37578	3661.0	299.0	-150.9
288.0	607181	180629	-37729	3667.8	292.2	-151.0
289.0	610852	180918	-37880	3674.6	285.5	-151.1
290.0	614530	181200	-38031	3681.4	278.7	-151.1
291.0	618214	181475	-38182	3688.2	271.9	-151.2
292.0	621906	181744	-38333	3695.0	265.1	-151.2
293.0	625604	182005	-38485	3701.8	258.3	-151.3
294.0	629310	182260	-38636	3708.7	251.5	-151.4
295.0	633022	182508	-38787	3715.6	244.8	-151.4
296.0	636741	182750	-38939	3722.4	238.0	-151.5
297.0	640467	182984	-39090	3729.3	231.2	-151.5
298.0	644199	183212	-39242	3736.1	224.4	-151.6
299.0	647939	183433	-39393	3743.0	217.6	-151.7
300.0	651685	183647	-39545	3749.9	210.8	-151.7
301.0	655439	183855	-39697	3756.9	204.0	-151.8
302.0	659199	184055	-39849	3763.8	197.2	-151.9
303.0	662966	184249	-40001	3770.8	190.4	-151.9
304.0	666741	184436	-40153	3777.8	183.5	-152.0
305.0	670522	184616	-40305	3784.8	176.7	-152.0
306.0	674310	184789	-40457	3791.8	169.8	-152.1
307.0	678106	184956	-40609	3798.8	163.0	-152.2
308.0	681908	185115	-40761	3805.9	156.1	-152.3
309.0	685717	185268	-40913	3812.9	149.2	-152.3
310.0	689534	185414	-41066	3820.0	142.4	-152.3
311.0	693357	185553	-41218	3827.0	135.5	-152.4
312.0	697188	185685	-41371	3834.1	128.7	-152.4
313.0	701025	185810	-41523	3841.2	121.8	-152.5
314.0	704870	185928	-41676	3848.3	114.9	-152.6
315.0	708722	186040	-41828	3855.4	108.0	-152.7
316.0	712581	186144	-41981	3862.5	101.1	-152.7
317.0	716447	186242	-42134	3869.7	94.2	-152.8
318.0	720320	186333	-42286	3876.8	87.3	-152.8
319.0	724201	186416	-42439	3884.0	80.4	-152.9
320.0	728088	186493	-42592	3891.2	73.4	-153.0

TABLE VIII (U)

TIME SEC	SPACE-FIXED-POSITION			SPACE-FIXED-VELOCITY		
	XS M	YS M	ZS M	DXS M/SEC	DYS M/SEC	DZS M/SEC
321.0	731983	186563	-42745	3898.4	66.5	-153.0
322.0	735885	186626	-42898	3905.7	59.5	-153.1
323.0	739794	186682	-43052	3912.9	52.6	-153.2
324.0	743711	186731	-43205	3920.2	45.6	-153.2
325.0	747635	186774	-43358	3927.4	38.7	-153.3
326.0	751566	186809	-43511	3934.8	31.7	-153.4
327.0	755504	186837	-43665	3942.1	24.7	-153.4
328.0	759450	186858	-43818	3949.4	17.8	-153.5
329.0	763403	186873	-43972	3956.8	10.8	-153.5
330.0	767363	186880	-44125	3964.1	3.8	-153.6
331.0	771331	186880	-44279	3971.5	-3.2	-153.7
332.0	775306	186873	-44432	3978.9	-10.2	-153.7
333.0	779289	186860	-44586	3986.3	-17.2	-153.8
334.0	783279	186839	-44740	3993.8	-24.2	-153.8
335.0	787277	186811	-44894	4001.2	-31.2	-153.9
336.0	791282	186777	-45048	4008.7	-38.2	-154.0
337.0	795294	186735	-45202	4016.2	-45.2	-154.0
338.0	799314	186686	-45356	4023.7	-52.3	-154.1
339.0	803341	186630	-45510	4031.2	-59.3	-154.2
340.0	807376	186567	-45664	4038.7	-66.4	-154.2
341.0	811419	186498	-45818	4046.2	-73.4	-154.3
342.0	815469	186421	-45973	4053.7	-80.5	-154.3
343.0	819526	186337	-46127	4061.2	-87.5	-154.4
344.0	823591	186246	-46282	4068.8	-94.6	-154.5
345.0	827664	186147	-46436	4076.4	-101.7	-154.5
346.0	831744	186042	-46591	4084.0	-108.8	-154.6
347.0	835832	185930	-46745	4091.7	-115.9	-154.6
348.0	839927	185810	-46900	4099.3	-123.0	-154.7
349.0	844030	185684	-47055	4107.0	-130.2	-154.8
350.0	848141	185550	-47210	4114.6	-137.3	-154.8
351.0	852260	185409	-47364	4122.3	-144.4	-154.9
352.0	856386	185261	-47519	4130.0	-151.5	-155.0
353.0	860520	185106	-47674	4137.8	-158.7	-155.0
354.0	864661	184944	-47829	4145.5	-165.8	-155.1
355.0	868811	184774	-47984	4153.3	-173.0	-155.2
356.0	872968	184598	-48140	4161.0	-180.2	-155.2
357.0	877133	184414	-48295	4168.8	-187.4	-155.3
358.0	881306	184223	-48450	4176.6	-194.6	-155.3
359.0	885486	184025	-48606	4184.5	-201.8	-155.4
360.0	889675	183820	-48761	4192.4	-208.9	-155.5

TABLE VIII (U)

TIME SEC	SPACE-FIXED-POSITION			SPACE-FIXED-VELOCITY		
	XS M	YS M	ZS M	DXS M/SEC	DYS M/SEC	DZS M/SEC
361.0	893871	183607	-48917	4200.3	-216.1	-155.5
362.0	898075	183387	-49072	4208.2	-223.3	-155.6
363.0	902287	183160	-49228	4216.1	-230.5	-155.7
364.0	906507	182926	-49383	4224.0	-237.8	-155.7
365.0	910735	182685	-49539	4231.9	-245.0	-155.8
366.0	914971	182436	-49695	4239.9	-252.2	-155.8
367.0	919215	182180	-49851	4247.8	-259.5	-155.9
368.0	923467	181917	-50007	4255.8	-266.7	-155.9
369.0	927726	181647	-50163	4263.8	-274.0	-156.0
370.0	931994	181369	-50319	4271.8	-281.2	-156.1
371.0	936270	181085	-50475	4279.8	-288.6	-156.1
372.0	940554	180792	-50631	4287.9	-295.9	-156.2
373.0	944846	180493	-50787	4295.9	-303.2	-156.2
374.0	949146	180186	-50943	4304.0	-310.5	-156.3
375.0	953454	179872	-51100	4312.1	-317.9	-156.4
376.0	957770	179550	-51256	4320.2	-325.2	-156.4
377.0	962094	179221	-51413	4328.3	-332.5	-156.5
378.0	966427	178885	-51569	4336.5	-339.9	-156.6
379.0	970767	178541	-51726	4344.6	-347.3	-156.7
380.0	975116	178190	-51883	4352.8	-354.7	-156.7
381.0	979473	177832	-52039	4361.0	-362.1	-156.8
382.0	983838	177466	-52196	4369.2	-369.5	-156.9
383.0	988211	177093	-52353	4377.4	-376.9	-156.9
384.0	992593	176712	-52510	4385.7	-384.3	-157.0
385.0	996982	176324	-52667	4393.9	-391.8	-157.0
386.0	1001380	175929	-52824	4402.2	-399.2	-157.1
387.0	1005787	175526	-52981	4410.5	-406.7	-157.1
388.0	1010201	175115	-53138	4418.8	-414.2	-157.1
389.0	1014624	174697	-53295	4427.2	-421.7	-157.2
390.0	1019056	174272	-53453	4435.5	-429.2	-157.3
391.0	1023495	173839	-53610	4443.9	-436.7	-157.3
392.0	1027944	173399	-53767	4452.3	-444.3	-157.4
393.0	1032400	172951	-53925	4460.7	-451.8	-157.4
394.0	1036865	172495	-54082	4469.2	-459.3	-157.5
395.0	1041338	172032	-54240	4477.7	-466.9	-157.5
396.0	1045820	171561	-54397	4486.2	-474.4	-157.6
397.0	1050311	171083	-54555	4494.7	-482.0	-157.7
398.0	1054810	170597	-54713	4503.3	-489.5	-157.8
399.0	1059317	170104	-54871	4511.8	-497.1	-157.8
400.0	1063834	169603	-55028	4520.4	-504.7	-157.9

TABLE VIII (U)

TIME SEC	SPACE-FIXED-POSITION			SPACE-FIXED-VELOCITY		
	XS M	YS M	ZS M	DXS M/SEC	DYS M/SEC	DZS M/SEC
401.0	1068358	169095	-55186	4529.0	-512.3	-158.0
402.0	1072892	168579	-55344	4537.5	-519.9	-158.0
403.0	1077433	168055	-55502	4546.2	-527.6	-158.1
404.0	1081984	167523	-55660	4554.8	-535.2	-158.2
405.0	1086543	166984	-55819	4563.5	-542.9	-158.3
406.0	1091111	166438	-55977	4572.2	-550.5	-158.3
407.0	1095687	165883	-56135	4580.9	-558.2	-158.4
408.0	1100273	165321	-56294	4589.6	-565.8	-158.4
409.0	1104867	164752	-56452	4598.3	-573.5	-158.5
410.0	1109469	164174	-56611	4607.0	-581.2	-158.6
411.0	1114081	163589	-56769	4615.8	-588.9	-158.7
412.0	1118701	162996	-56928	4624.6	-596.6	-158.7
413.0	1123330	162396	-57087	4633.5	-604.4	-158.8
414.0	1127968	161788	-57246	4642.4	-612.1	-158.9
415.0	1132615	161172	-57405	4651.3	-619.9	-158.9
416.0	1137270	160548	-57564	4660.2	-627.7	-159.0
417.0	1141935	159916	-57723	4669.1	-635.5	-159.0
418.0	1146608	159277	-57882	4678.1	-643.3	-159.1
419.0	1151291	158630	-58041	4687.0	-651.1	-159.2
420.0	1155983	157975	-58200	4696.0	-658.9	-159.2
421.0	1160683	157312	-58359	4705.1	-666.8	-159.3
422.0	1165393	156641	-58519	4714.1	-674.6	-159.4
423.0	1170111	155963	-58678	4723.2	-682.5	-159.4
424.0	1174839	155276	-58837	4732.3	-690.3	-159.5
425.0	1179576	154582	-58997	4741.5	-698.2	-159.6
426.0	1184322	153880	-59157	4750.7	-706.1	-159.6
427.0	1189077	153170	-59316	4759.9	-714.0	-159.7
428.0	1193842	152452	-59476	4769.1	-721.9	-159.8
429.0	1198616	151726	-59636	4778.2	-729.9	-159.8
430.0	1203398	150992	-59796	4787.5	-737.8	-159.9
431.0	1208190	150250	-59955	4796.7	-745.8	-159.9
432.0	1212992	149500	-60115	4806.0	-753.8	-160.0
433.0	1217802	148743	-60276	4815.3	-761.8	-160.1
434.0	1222622	147977	-60436	4824.6	-769.8	-160.1
435.0	1227452	147203	-60596	4833.9	-777.8	-160.2
436.0	1232290	146421	-60756	4843.3	-785.8	-160.3
437.0	1237138	145631	-60916	4852.6	-793.8	-160.3
438.0	1241995	144834	-61077	4862.0	-801.9	-160.4
439.0	1246862	144028	-61237	4871.4	-810.0	-160.5
440.0	1251738	143214	-61398	4880.8	-818.1	-160.6

TABLE VIII (U)

TIME SEC	SPACE-FIXED-POSITION			SPACE-FIXED-VELOCITY		
	XS M	YS M	ZS M	DXS M/SEC	DYS M/SEC	DZS M/SEC
441.0	1256624	142391	-61558	4890.3	-826.2	-160.6
442.0	1261519	141561	-61719	4899.8	-834.3	-160.7
443.0	1266423	140723	-61880	4909.4	-842.4	-160.7
444.0	1271338	139877	-62040	4919.0	-850.5	-160.8
445.0	1276261	139022	-62201	4928.6	-858.7	-160.9
446.0	1281195	138159	-62362	4938.2	-866.8	-160.9
447.0	1286138	137288	-62523	4947.9	-875.0	-161.0
448.0	1291090	136409	-62684	4957.5	-883.2	-161.1
449.0	1296053	135522	-62845	4967.3	-891.5	-161.2
450.0	1301025	134626	-63006	4977.0	-899.7	-161.2
451.0	1306007	133722	-63168	4986.8	-907.9	-161.3
452.0	1310999	132810	-63329	4996.5	-916.2	-161.4
453.0	1316000	131890	-63490	5006.3	-924.5	-161.4
454.0	1321011	130961	-63652	5016.2	-932.8	-161.5
455.0	1326032	130024	-63813	5026.0	-941.1	-161.6
456.0	1331063	129079	-63975	5035.9	-949.5	-161.7
457.0	1336104	128125	-64137	5045.8	-957.8	-161.7
458.0	1341155	127163	-64298	5055.7	-966.2	-161.8
459.0	1346216	126193	-64460	5065.7	-974.6	-161.9
460.0	1351286	125214	-64622	5075.7	-983.0	-161.9
461.0	1356367	124227	-64784	5085.7	-991.4	-162.0
462.0	1361458	123231	-64946	5095.7	-999.8	-162.1
463.0	1366558	122227	-65108	5105.8	-1008.3	-162.1
464.0	1371669	121215	-65270	5115.8	-1016.7	-162.2
465.0	1376790	120194	-65433	5125.9	-1025.2	-162.3
466.0	1381921	119165	-65595	5136.0	-1033.6	-162.4
467.0	1387062	118127	-65757	5146.1	-1042.1	-162.4
468.0	1392213	117080	-65920	5156.3	-1050.6	-162.5
469.0	1397375	116025	-66082	5166.6	-1059.2	-162.6
470.0	1402546	114962	-66245	5176.8	-1067.7	-162.7
471.0	1407728	113890	-66408	5187.1	-1076.3	-162.7
472.0	1412921	112809	-66571	5197.4	-1084.9	-162.8
473.0	1418123	111720	-66733	5207.8	-1093.5	-162.9
474.0	1423336	110622	-66896	5218.1	-1102.1	-162.9
475.0	1428559	109516	-67059	5228.5	-1110.8	-163.0
476.0	1433793	108401	-67222	5238.9	-1119.5	-163.1
477.0	1439037	107277	-67385	5249.4	-1128.1	-163.2
478.0	1444292	106144	-67549	5259.8	-1136.8	-163.2
479.0	1449557	105003	-67712	5270.3	-1145.6	-163.3
480.0	1454833	103853	-67875	5280.9	-1154.3	-163.4

TABLE VIII (U)

TIME SEC	SPACE-FIXED-POSITION			SPACE-FIXED-VELOCITY		
	XS M	YS M	ZS M	DXS M/SEC	DYS M/SEC	DZS M/SEC
481.0	1460119	102695	-68039	5291.4	-1163.1	-163.5
482.0	1465415	101527	-68202	5302.0	-1171.9	-163.5
483.0	1470723	100351	-68366	5312.7	-1180.7	-163.6
484.0	1476041	99166	-68529	5323.4	-1189.5	-163.7
485.0	1481370	97972	-68693	5334.1	-1198.3	-163.8
486.0	1486709	96769	-68857	5344.8	-1207.2	-163.9
487.0	1492059	95557	-69021	5355.6	-1216.1	-163.9
488.0	1497420	94337	-69185	5366.4	-1225.0	-164.0
489.0	1502792	93108	-69349	5377.2	-1233.9	-164.1
490.0	1508175	91869	-69513	5388.1	-1242.9	-164.2
491.0	1513568	90622	-69677	5399.0	-1251.9	-164.2
492.0	1518973	89365	-69842	5409.9	-1260.9	-164.3
493.0	1524388	88100	-70006	5420.9	-1269.9	-164.4
494.0	1529814	86825	-70170	5431.8	-1279.0	-164.4
495.0	1535252	85542	-70335	5442.9	-1288.0	-164.5
496.0	1540700	84249	-70499	5453.9	-1297.1	-164.6
497.0	1546159	82948	-70664	5465.0	-1306.2	-164.7
498.0	1551630	81637	-70829	5476.2	-1315.3	-164.8
499.0	1557112	80317	-70993	5487.4	-1324.5	-164.8
500.0	1562605	78988	-71158	5498.6	-1333.7	-164.9
501.0	1568109	77650	-71323	5509.8	-1342.9	-165.0
502.0	1573624	76302	-71488	5521.1	-1352.1	-165.1
503.0	1579151	74945	-71653	5532.4	-1361.3	-165.2
504.0	1584689	73580	-71819	5543.8	-1370.5	-165.3
505.0	1590239	72204	-71984	5555.2	-1379.8	-165.4
506.0	1595800	70820	-72149	5566.6	-1389.0	-165.4
507.0	1601372	69426	-72315	5578.1	-1398.4	-165.5
508.0	1606956	68023	-72480	5589.5	-1407.7	-165.6
509.0	1612551	66611	-72646	5601.0	-1417.1	-165.7
510.0	1618158	65189	-72812	5612.6	-1426.4	-165.8
511.0	1623776	63758	-72978	5624.2	-1435.8	-165.9
512.0	1629406	62318	-73144	5635.8	-1445.2	-166.0
513.0	1635048	60868	-73310	5647.5	-1454.7	-166.1
514.0	1640701	59408	-73476	5659.2	-1464.2	-166.1
515.0	1646366	57939	-73642	5671.0	-1473.7	-166.2
516.0	1652043	56461	-73808	5682.8	-1483.2	-166.3
517.0	1657732	54973	-73975	5694.7	-1492.7	-166.4
518.0	1663432	53475	-74141	5706.5	-1502.3	-166.5
519.0	1669145	51968	-74308	5718.5	-1511.9	-166.6
520.0	1674869	50452	-74474	5730.4	-1521.5	-166.7

TABLE VIII (U)

TIME SEC	SPACE-FIXED-POSITION			SPACE-FIXED-VELOCITY		
	XS M	YS M	ZS M	DXS M/SEC	DYS M/SEC	DZS M/SEC
521.0	1680606	48925	-74641	5742.5	-1531.2	-166.8
522.0	1686354	47389	-74808	5754.5	-1540.9	-166.9
523.0	1692115	45843	-74975	5766.6	-1550.6	-167.0
524.0	1697888	44288	-75142	5778.7	-1560.4	-167.1
525.0	1703672	42723	-75309	5790.9	-1570.1	-167.2
526.0	1709469	41148	-75476	5803.0	-1579.9	-167.3
527.0	1715278	39563	-75644	5815.2	-1589.7	-167.4
528.0	1721100	37968	-75811	5827.5	-1599.5	-167.5
529.0	1726933	36364	-75979	5839.8	-1609.3	-167.6
530.0	1732779	34750	-76146	5852.1	-1619.2	-167.7
531.0	1738638	33125	-76314	5864.6	-1629.2	-167.8
532.0	1744508	31491	-76482	5877.0	-1639.1	-167.9
533.0	1750392	29847	-76650	5889.5	-1649.0	-168.0
534.0	1756288	28193	-76818	5902.1	-1659.0	-168.1
535.0	1762196	26529	-76986	5914.7	-1669.1	-168.2
536.0	1768117	24855	-77154	5927.3	-1679.1	-168.3
537.0	1774050	23171	-77322	5939.9	-1689.2	-168.3
538.0	1779997	21477	-77491	5952.6	-1699.3	-168.4
539.0	1785956	19772	-77659	5965.4	-1709.4	-168.6
540.0	1791928	18058	-77828	5978.2	-1719.6	-168.7
541.0	1797912	16333	-77997	5991.1	-1729.8	-168.8
542.0	1803910	14598	-78165	6004.0	-1740.1	-168.9
543.0	1809920	12853	-78334	6017.0	-1750.4	-169.0
544.0	1815944	11097	-78503	6030.0	-1760.7	-169.1
545.0	1821980	9332	-78673	6043.0	-1771.0	-169.2
546.0	1828030	7555	-78842	6056.1	-1781.3	-169.3
547.0	1834092	5769	-79011	6069.3	-1791.6	-169.4
548.0	1840168	3972	-79181	6082.5	-1802.0	-169.5
549.0	1846257	2165	-79350	6095.7	-1812.4	-169.6
550.0	1852360	347	-79520	6109.1	-1822.8	-169.7
551.0	1858476	-1480	-79690	6122.4	-1833.3	-169.8
552.0	1864605	-3318	-79860	6135.8	-1843.9	-169.9
553.0	1870747	-5168	-80030	6149.3	-1854.5	-170.1
554.0	1876903	-7027	-80200	6162.8	-1865.1	-170.2
555.0	1883073	-8898	-80370	6176.4	-1875.7	-170.3
556.0	1889256	-10779	-80540	6190.0	-1886.3	-170.4
557.0	1895453	-12670	-80711	6203.7	-1897.0	-170.5
558.0	1901664	-14573	-80881	6217.4	-1907.7	-170.6
559.0	1907888	-16486	-81052	6231.1	-1918.5	-170.7
560.0	1914126	-18410	-81222	6245.0	-1929.3	-170.8

TABLE VIII (U)

TIME SEC	SPACE-FIXED-POSITION			SPACE-FIXED-VELOCITY		
	XS M	YS M	ZS M	DXS M/SEC	DYS M/SEC	DZS M/SEC
561.0	1920378	-20344	-81393	6258.9	-1940.1	-170.9
562.0	1926644	-22290	-81564	6272.8	-1951.0	-171.0
563.0	1932923	-24247	-81735	6286.8	-1961.9	-171.1
564.0	1939217	-26214	-81906	6300.9	-1972.8	-171.2
565.0	1945525	-28192	-82078	6315.0	-1983.8	-171.3
566.0	1951847	-30181	-82249	6329.2	-1994.8	-171.4
567.0	1958184	-32182	-82421	6343.4	-2005.9	-171.5
568.0	1964534	-34193	-82592	6357.7	-2017.0	-171.7
569.0	1970899	-36216	-82764	6372.0	-2028.1	-171.8
570.0	1977278	-38249	-82936	6386.4	-2039.3	-171.9
571.0	1983672	-40294	-83108	6400.9	-2050.5	-172.0
572.0	1990080	-42350	-83280	6415.4	-2061.8	-172.1
573.0	1996503	-44418	-83452	6429.9	-2073.0	-172.3
574.0	2002940	-46496	-83624	6444.6	-2084.3	-172.4
575.0	2009392	-48586	-83797	6459.3	-2095.6	-172.5
576.0	2015859	-50688	-83969	6474.1	-2107.0	-172.6
577.0	2022340	-52800	-84142	6488.9	-2118.4	-172.7
578.0	2028836	-54925	-84315	6503.8	-2129.9	-172.9
579.0	2035348	-57060	-84488	6518.8	-2141.5	-173.0
580.0	2041874	-59207	-84661	6533.8	-2153.0	-173.1
581.0	2048415	-61366	-84834	6548.9	-2164.7	-173.2
582.0	2054972	-63537	-85007	6564.0	-2176.3	-173.3
583.0	2061543	-65719	-85180	6579.3	-2188.1	-173.4
584.0	2068130	-67913	-85354	6594.5	-2199.9	-173.5
585.0	2074732	-70119	-85528	6609.8	-2211.7	-173.6
586.0	2081350	-72336	-85701	6625.1	-2223.6	-173.7
587.0	2087983	-74566	-85875	6640.6	-2235.5	-173.8
588.0	2094631	-76808	-86049	6656.1	-2247.6	-173.9
589.0	2101295	-79061	-86223	6671.6	-2259.7	-174.0
590.0	2107974	-81327	-86397	6687.3	-2271.8	-174.2
591.0	2114669	-83605	-86571	6703.0	-2284.0	-174.3
592.0	2121380	-85895	-86746	6718.7	-2296.3	-174.4
593.0	2128107	-88197	-86920	6734.5	-2308.6	-174.5
594.0	2134849	-90512	-87095	6750.4	-2321.0	-174.7
595.0	2141608	-92839	-87269	6766.4	-2333.4	-174.8
596.0	2148382	-95179	-87444	6782.4	-2345.9	-174.9
597.0	2155173	-97531	-87619	6798.5	-2358.4	-175.1
598.0	2161979	-99896	-87794	6814.6	-2371.1	-175.2
599.0	2168802	-102273	-87970	6830.9	-2383.8	-175.4
600.0	2175641	-104664	-88145	6847.2	-2396.6	-175.5

TABLE VIII (U)

TIME SEC	SPACE-FIXED-POSITION			SPACE-FIXED-VELOCITY		
	XS M	YS M	ZS M	DXS M/SEC	DYS M/SEC	DZS M/SEC
601.0	2182496	-107067	-88321	6863.6	-2409.5	-175.6
602.0	2189368	-109483	-88496	6880.0	-2422.5	-175.7
603.0	2196256	-111912	-88672	6896.6	-2435.4	-175.8
604.0	2203161	-114354	-88848	6913.1	-2448.5	-176.0
605.0	2210082	-116809	-89024	6929.7	-2461.6	-176.1
606.0	2217021	-119277	-89200	6946.4	-2474.8	-176.3
607.0	2223975	-121758	-89377	6963.2	-2488.0	-176.5
608.0	2230947	-124253	-89553	6980.0	-2501.2	-176.6
609.0	2237935	-126761	-89730	6997.0	-2514.6	-176.8
610.0	2244941	-129282	-89907	7013.9	-2528.0	-177.0
611.0	2251963	-131817	-90084	7031.0	-2541.5	-177.2
612.0	2259003	-134365	-90261	7048.1	-2555.0	-177.3
613.0	2266060	-136927	-90439	7065.3	-2568.7	-177.5
614.0	2273134	-139502	-90616	7082.6	-2582.4	-177.7
615.0	2280225	-142092	-90794	7099.9	-2596.2	-177.8
616.0	2287333	-144695	-90972	7117.4	-2610.0	-178.0
617.0	2294459	-147312	-91150	7134.9	-2624.2	-178.2
618.0	2301603	-149943	-91328	7152.5	-2637.8	-178.4
619.0	2308764	-152587	-91507	7170.2	-2651.7	-178.6
620.0	2315944	-155246	-91685	7187.9	-2665.8	-178.8
621.0	2323140	-157919	-91864	7205.8	-2680.2	-179.0
622.0	2330355	-160607	-92043	7223.7	-2694.8	-179.1
623.0	2337588	-163309	-92223	7241.8	-2709.1	-179.3
624.0	2344839	-166026	-92402	7259.9	-2723.6	-179.5
625.0	2352108	-168757	-92582	7278.1	-2738.3	-179.7
626.0	2359395	-171503	-92761	7296.5	-2752.9	-179.9
627.0	2366702	-174264	-92941	7314.8	-2767.6	-180.1
628.0	2374028	-177040	-93122	7333.3	-2782.4	-180.3
629.0	2381371	-179830	-93302	7351.8	-2797.4	-180.5
S-IV CUTOFF SIGNAL						
629.970	2388507	-182549	-93477	7369.1	-2811.7	-180.7
630.0	2388728	-182633	-93483	7369.6	-2812.1	-180.7
631.0	2396093	-185448	-93663	7367.7	-2820.1	-180.6
632.0	2403460	-188273	-93844	7364.4	-2828.5	-180.5
633.0	2410824	-191107	-94024	7361.1	-2837.0	-180.4
634.0	2418185	-193948	-94204	7357.8	-2845.6	-180.3
635.0	2425541	-196798	-94385	7354.5	-2853.9	-180.2

TABLE VIII (U)

TIME SEC	SPACE-FIXED-POSITION			SPACE-FIXED-VELOCITY		
	XS M	YS M	ZS M	DXS M/SEC	DYS M/SEC	DZS M/SEC
636.0	2432894	-199656	-94565	7351.2	-2862.3	-180.1
637.0	2440244	-202522	-94745	7347.9	-2870.8	-179.9
638.0	2447590	-205397	-94925	7344.5	-2879.2	-179.8
639.0	2454933	-208281	-95104	7341.2	-2887.6	-179.7
<b>INSERTION</b>						
639.970	2462052	-211086	-95279	7337.9	-2895.7	-179.6

TABLE IX (U)

TIME SEC	EARTH-FIXED-ACCELERATION			SPACE-FIXED-ACCELERATION		
	DDXE M/SEC SQ	DDYE M/SEC SQ	DDZE M/SEC SQ	DDXS M/SEC SQ	DDYS M/SEC SQ	DDZS M/SEC SQ

## FIRST MOTION

0.310	0.16	3.29	-0.08	0.15	3.27	-0.10
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## LIFTOFF SIGNAL

0.410	0.14	3.30	-0.08	0.13	3.27	-0.09
1.0	0.05	3.32	-0.07	0.05	3.30	-0.08
2.0	-0.03	3.38	-0.05	-0.04	3.36	-0.07
3.0	-0.06	3.46	-0.04	-0.06	3.43	-0.06
4.0	-0.06	3.54	-0.03	-0.06	3.52	-0.05
5.0	-0.05	3.63	-0.03	-0.05	3.61	-0.04
6.0	-0.03	3.72	-0.02	-0.03	3.70	-0.03
7.0	-0.03	3.82	-0.01	-0.03	3.79	-0.02
8.0	-0.03	3.91	0.01	-0.03	3.88	-0.01
9.0	-0.04	4.00	0.02	-0.04	3.98	0.00
10.0	-0.05	4.10	0.03	-0.05	4.07	0.02
11.0	-0.07	4.19	0.05	-0.06	4.17	0.03
12.0	-0.08	4.29	0.06	-0.07	4.27	0.05
13.0	-0.08	4.39	0.08	-0.07	4.36	0.06
14.0	-0.06	4.49	0.09	-0.05	4.46	0.07
15.0	-0.02	4.59	0.10	-0.02	4.57	0.08
16.0	0.04	4.69	0.11	0.05	4.67	0.09
17.0	0.13	4.79	0.12	0.14	4.77	0.10
18.0	0.26	4.89	0.12	0.27	4.86	0.11
19.0	0.41	4.98	0.13	0.42	4.95	0.11
20.0	0.60	5.06	0.13	0.61	5.04	0.11
21.0	0.81	5.14	0.13	0.82	5.11	0.11
22.0	1.04	5.20	0.13	1.05	5.18	0.11
23.0	1.29	5.26	0.13	1.30	5.23	0.11
24.0	1.55	5.30	0.13	1.56	5.27	0.11
25.0	1.81	5.33	0.13	1.83	5.30	0.11
26.0	2.08	5.36	0.13	2.10	5.33	0.11
27.0	2.34	5.39	0.14	2.36	5.36	0.12
28.0	2.57	5.46	0.17	2.59	5.43	0.15
29.0	2.81	5.52	0.18	2.83	5.49	0.15
30.0	3.06	5.59	0.17	3.08	5.55	0.15

TABLE IX (U)

TIME SEC	EARTH-FIXED-ACCELERATION						SPACE-FIXED-ACCELERATION					
	DDXE M/SEC SQ	DDYE M/SEC SQ	DDZE M/SEC SQ	DDXS M/SEC SQ	DDYS M/SEC SQ	DDZS M/SEC SQ	DDXE M/SEC SQ	DDYE M/SEC SQ	DDZE M/SEC SQ	DDXS M/SEC SQ	DDYS M/SEC SQ	DDZS M/SEC SQ
31.0	3.30	5.66	0.16	3.33	5.62	0.14						
32.0	3.55	5.73	0.14	3.57	5.70	0.11						
33.0	3.80	5.81	0.10	3.83	5.77	0.07						
34.0	4.05	5.90	0.06	4.08	5.86	0.03						
35.0	4.25	5.95	0.04	4.28	5.91	0.01						
36.0	4.41	5.98	0.03	4.44	5.93	-0.00						
37.0	4.54	6.00	0.02	4.57	5.96	-0.02						
38.0	4.68	6.08	0.00	4.71	6.03	-0.03						
39.0	4.83	6.17	-0.01	4.86	6.13	-0.05						
40.0	4.98	6.30	-0.01	5.02	6.25	-0.05						
41.0	5.15	6.39	-0.03	5.18	6.34	-0.07						
42.0	5.25	6.45	-0.07	5.29	6.40	-0.10						
43.0	5.34	6.51	-0.11	5.38	6.46	-0.15						
44.0	5.44	6.60	-0.13	5.48	6.55	-0.17						
45.0	5.52	6.68	-0.13	5.56	6.63	-0.17						
46.0	5.63	6.77	-0.10	5.67	6.72	-0.14						
47.0	5.75	6.86	-0.07	5.80	6.80	-0.11						
48.0	5.90	6.95	-0.06	5.95	6.89	-0.10						
49.0	6.06	7.04	-0.08	6.11	6.98	-0.13						
50.0	6.27	7.13	-0.13	6.32	7.07	-0.18						
51.0	6.46	7.20	-0.18	6.51	7.14	-0.23						
52.0	6.66	7.26	-0.22	6.71	7.20	-0.27						
53.0	6.96	7.32	-0.21	7.01	7.25	-0.26						
54.0	7.24	7.21	-0.17	7.30	7.14	-0.22						
MACH ØNE												
54.693	7.32	7.05	-0.15	7.37	6.98	-0.21						
55.0	7.34	6.98	-0.15	7.40	6.91	-0.21						
56.0	7.41	6.76	-0.19	7.47	6.69	-0.25						
57.0	7.54	6.55	-0.26	7.60	6.48	-0.32						
58.0	7.74	6.50	-0.31	7.80	6.42	-0.37						
59.0	7.94	6.61	-0.31	8.00	6.53	-0.37						
60.0	8.14	6.75	-0.27	8.20	6.67	-0.33						
61.0	8.38	6.87	-0.23	8.44	6.79	-0.29						
62.0	8.68	6.97	-0.28	8.74	6.88	-0.34						
63.0	9.02	7.07	-0.41	9.09	6.98	-0.48						
64.0	9.36	7.17	-0.58	9.43	7.08	-0.65						
65.0	9.61	7.32	-0.71	9.68	7.23	-0.78						

TABLE IX (U)

TIME SEC	EARTH-FIXED-ACCELERATION			SPACE-FIXED-ACCELERATION		
	DDXE M/SEC SQ	DDYE M/SEC SQ	DDZE M/SEC SQ	DDXS M/SEC SQ	DDYS M/SEC SQ	DDZS M/SEC SQ
66.0	9.84	7.51	-0.74	9.91	7.41	-0.81
67.0	10.05	7.70	-0.67	10.12	7.60	-0.74
68.0	10.38	7.85	-0.52	10.46	7.74	-0.60
69.0	10.69	8.00	-0.45	10.76	7.89	-0.53
MAXIMUM DYNAMIC PRESSURE						
69.210	10.75	8.03	-0.43	10.83	7.92	-0.51
70.0	11.01	8.14	-0.39	11.09	8.03	-0.47
71.0	11.35	8.28	-0.35	11.43	8.16	-0.44
72.0	11.70	8.40	-0.33	11.79	8.28	-0.42
73.0	12.06	8.51	-0.31	12.14	8.39	-0.41
74.0	12.42	8.63	-0.37	12.51	8.51	-0.46
75.0	12.90	8.72	-0.42	12.99	8.59	-0.51
76.0	13.38	8.79	-0.41	13.47	8.66	-0.51
77.0	13.84	8.89	-0.31	13.93	8.75	-0.41
78.0	14.22	8.99	-0.18	14.32	8.84	-0.29
79.0	14.61	9.11	-0.06	14.71	8.96	-0.17
80.0	14.96	9.26	-0.04	15.06	9.11	-0.16
81.0	15.41	9.38	-0.10	15.51	9.23	-0.22
82.0	15.84	9.47	-0.19	15.94	9.30	-0.31
83.0	16.27	9.53	-0.25	16.37	9.36	-0.37
84.0	16.74	9.59	-0.22	16.85	9.41	-0.34
85.0	17.28	9.71	-0.05	17.39	9.53	-0.18
86.0	17.74	9.82	0.02	17.86	9.64	-0.11
87.0	18.05	9.97	0.01	18.17	9.78	-0.13
88.0	18.34	10.10	-0.08	18.46	9.90	-0.22
89.0	18.70	10.24	-0.11	18.82	10.04	-0.25
90.0	19.26	10.35	0.02	19.39	10.14	-0.13
91.0	19.85	10.43	0.13	19.98	10.22	-0.02
92.0	20.30	10.50	0.11	20.43	10.28	-0.04
93.0	20.57	10.59	-0.04	20.70	10.37	-0.21
94.0	20.85	10.72	-0.13	20.99	10.49	-0.30
95.0	21.28	10.82	-0.13	21.42	10.58	-0.30
96.0	21.83	10.90	-0.03	21.96	10.66	-0.20
97.0	22.40	10.97	0.06	22.54	10.72	-0.12
98.0	22.89	11.04	0.06	23.03	10.78	-0.13
99.0	23.42	11.11	0.15	23.56	10.84	-0.04
100.0	23.86	11.22	0.22	24.01	10.95	0.02

TABLE IX (U)

TIME SEC	EARTH-FIXED-ACCELERATION				SPACE-FIXED-ACCELERATION			
	DDXE M/SEC	DDYE M/SEC	DDZE M/SEC		DDXS M/SEC	DDYS M/SEC	DDZS M/SEC	
SQ	SQ	SQ	SQ	SQ	SQ	SQ	SQ	
101.0	24.14	11.35	0.02		24.29	11.07	-0.18	
102.0	24.46	11.46	-0.17		24.61	11.18	-0.37	
103.0	24.84	11.57	-0.27		25.00	11.28	-0.48	
104.0	25.34	11.67	-0.25		25.49	11.36	-0.46	
105.0	25.93	11.73	-0.13		26.09	11.42	-0.35	
106.0	26.53	11.79	-0.04		26.69	11.47	-0.27	
107.0	27.01	11.88	-0.10		27.17	11.55	-0.33	
108.0	27.44	12.00	-0.16		27.61	11.66	-0.39	
109.0	28.01	12.09	-0.04		28.19	11.75	-0.28	
110.0	28.53	12.19	-0.03		28.71	11.84	-0.27	
111.0	29.00	12.28	-0.13		29.18	11.92	-0.39	
112.0	29.51	12.34	-0.25		29.69	11.97	-0.51	
113.0	30.07	12.39	-0.32		30.25	12.01	-0.59	
114.0	30.70	12.43	-0.31		30.88	12.04	-0.58	
115.0	31.32	12.47	-0.23		31.51	12.07	-0.51	
116.0	31.93	12.53	-0.18		32.12	12.12	-0.46	
117.0	32.55	12.58	-0.17		32.74	12.16	-0.46	
118.0	33.17	12.64	-0.18		33.37	12.21	-0.48	
119.0	33.81	12.70	-0.19		34.01	12.26	-0.50	
120.0	34.47	12.75	-0.20		34.68	12.30	-0.51	
121.0	35.17	12.80	-0.18		35.37	12.34	-0.49	
122.0	35.86	12.86	-0.16		36.07	12.38	-0.48	
123.0	36.56	12.91	-0.16		36.77	12.42	-0.49	
124.0	37.30	12.95	-0.14		37.51	12.45	-0.48	
125.0	38.05	12.99	-0.11		38.26	12.47	-0.46	
126.0	38.82	13.02	-0.09		39.04	12.49	-0.45	
127.0	39.63	13.04	-0.09		39.85	12.50	-0.45	
128.0	40.44	13.09	-0.10		40.67	12.53	-0.47	
129.0	41.28	13.15	-0.09		41.50	12.58	-0.47	
130.0	42.14	13.21	-0.09		42.37	12.63	-0.48	
131.0	42.98	13.33	-0.08		43.21	12.73	-0.48	
132.0	43.80	13.54	-0.10		44.04	12.92	-0.51	
133.0	44.59	13.84	-0.12		44.83	13.21	-0.54	
134.0	45.39	14.21	-0.15		45.63	13.57	-0.58	
135.0	46.21	14.64	-0.12		46.46	13.98	-0.56	
136.0	47.05	15.04	-0.07		47.31	14.37	-0.52	
137.0	47.95	15.50	-0.02		48.21	14.81	-0.48	
138.0	48.80	15.98	0.02		49.07	15.27	-0.45	
139.0	49.70	16.50	0.02		49.98	15.78	-0.46	
140.0	50.55	17.05	0.02		50.84	16.31	-0.47	

TABLE IX (U)

TIME SEC	EARTH-FIXED-ACCELERATION			SPACE-FIXED-ACCELERATION		
	DDXE M/SEC SQ	DDYE M/SEC SQ	DDZE M/SEC SQ	DDXS M/SEC SQ	DDYS M/SEC SQ	DDZS M/SEC SQ
IECØ SIGNAL						
140.750	51.05	17.31	0.02	51.34	16.56	-0.48
141.0	42.25	9.75	0.02	42.48	9.07	-0.42
142.0	26.85	4.88	0.03	27.04	4.33	-0.33
143.0	26.15	4.43	0.03	26.33	3.88	-0.33
144.0	26.25	4.42	0.03	26.43	3.87	-0.33
145.0	26.45	4.75	0.03	26.64	4.19	-0.33
146.0	26.65	4.90	0.08	26.84	4.33	-0.29
ØECØ SIGNAL						
146.730	26.82	4.94	0.13	27.01	4.37	-0.25
147.0	15.75	3.78	0.06	15.93	3.31	-0.25
SEPARATION SIGNAL						
147.140	3.54	-7.16	0.05	3.62	-7.52	-0.18
148.0	0.68	-8.72	0.02	0.75	-9.05	-0.19
S-IV IGNITION SIGNAL						
148.840	0.70	-8.79	0.02	0.76	-9.12	-0.19
149.0	0.70	-8.77	0.02	0.76	-9.11	-0.19
150.0	0.78	-8.62	0.02	0.84	-8.96	-0.19
151.0	5.60	-6.10	0.05	5.69	-6.48	-0.19
152.0	5.50	-6.10	0.10	5.58	-6.48	-0.14
153.0	5.45	-6.10	0.12	5.53	-6.48	-0.12
154.0	5.40	-6.10	0.14	5.48	-6.48	-0.10
155.0	5.22	-6.15	0.13	5.30	-6.53	-0.10
156.0	5.40	-6.17	0.18	5.48	-6.55	-0.06
157.0	5.37	-6.13	0.21	5.45	-6.51	-0.03
158.0	5.42	-6.17	0.19	5.49	-6.55	-0.05
159.0	5.45	-6.19	0.17	5.52	-6.58	-0.07
160.0	5.48	-6.22	0.15	5.56	-6.61	-0.09

TABLE IX (U)

TIME SEC	EARTH-FIXED-ACCELERATION						SPACE-FIXED-ACCELERATION					
	DDXE M/SEC SQ		DDYE M/SEC SQ		DDZE M/SEC SQ		DDXS M/SEC SQ		DDYS M/SEC SQ		DDZS M/SEC SQ	
161.0	5.48	-6.21	0.15	5.55	-6.60	-0.09						
162.0	5.46	-6.16	0.17	5.53	-6.55	-0.07						
163.0	5.45	-6.13	0.18	5.52	-6.52	-0.06						
164.0	5.46	-6.13	0.19	5.53	-6.52	-0.05						
165.0	5.46	-6.12	0.20	5.53	-6.52	-0.04						
166.0	5.47	-6.12	0.19	5.54	-6.51	-0.05						
167.0	5.46	-6.08	0.19	5.53	-6.48	-0.05						
168.0	5.46	-6.06	0.17	5.53	-6.46	-0.07						
169.0	5.48	-6.07	0.16	5.55	-6.47	-0.08						
170.0	5.52	-6.12	0.16	5.58	-6.52	-0.08						
171.0	5.53	-6.12	0.15	5.59	-6.52	-0.09						
172.0	5.52	-6.09	0.15	5.58	-6.49	-0.09						
173.0	5.53	-6.09	0.13	5.59	-6.50	-0.11						
174.0	5.55	-6.12	0.10	5.61	-6.52	-0.14						
175.0	5.55	-6.11	0.09	5.61	-6.52	-0.15						
176.0	5.55	-6.09	0.16	5.61	-6.50	-0.08						
177.0	5.55	-6.06	0.23	5.60	-6.47	-0.01						
178.0	5.54	-6.03	0.28	5.60	-6.44	0.03						
179.0	5.55	-6.04	0.27	5.61	-6.45	0.03						
180.0	5.60	-6.10	0.24	5.65	-6.51	-0.00						
181.0	5.64	-6.16	0.18	5.69	-6.57	-0.07						
182.0	5.62	-6.12	0.15	5.67	-6.53	-0.09						
183.0	5.60	-6.08	0.15	5.65	-6.49	-0.10						
184.0	5.58	-6.02	0.15	5.63	-6.43	-0.10						
185.0	5.56	-5.97	0.15	5.61	-6.39	-0.10						
186.0	5.59	-5.99	0.15	5.63	-6.41	-0.10						
187.0	5.65	-6.07	0.16	5.69	-6.49	-0.08						
188.0	5.66	-6.07	0.20	5.70	-6.49	-0.05						
189.0	5.64	-6.02	0.23	5.69	-6.44	-0.02						
190.0	5.63	-5.99	0.23	5.67	-6.41	-0.02						
191.0	5.63	-5.98	0.21	5.68	-6.41	-0.04						
192.0	5.67	-6.03	0.17	5.71	-6.46	-0.08						
193.0	5.73	-6.12	0.14	5.77	-6.55	-0.11						
194.0	5.74	-6.12	0.14	5.78	-6.55	-0.11						
195.0	5.72	-6.06	0.15	5.75	-6.49	-0.10						
196.0	5.71	-6.02	0.16	5.74	-6.45	-0.09						
197.0	5.75	-6.08	0.16	5.78	-6.51	-0.09						
198.0	5.80	-6.15	0.17	5.83	-6.58	-0.08						
199.0	5.85	-6.22	0.15	5.88	-6.66	-0.11						
200.0	5.84	-6.17	0.17	5.87	-6.61	-0.09						

TABLE IX (U)

TIME SEC	EARTH-FIXED-ACCELERATION			SPACE-FIXED-ACCELERATION		
	DDXE M/SEC SQ	DDYE M/SEC SQ	DDZE M/SEC SQ	DDXS M/SEC SQ	DDYS M/SEC SQ	DDZS M/SEC SQ
201.0	5.79	-6.07	0.21	5.82	-6.50	-0.04
202.0	5.72	-5.92	0.24	5.75	-6.36	-0.02
203.0	5.70	-5.86	0.22	5.73	-6.30	-0.04
204.0	5.77	-5.99	0.16	5.80	-6.43	-0.10
205.0	5.84	-6.10	0.09	5.86	-6.54	-0.16
206.0	5.87	-6.13	0.10	5.89	-6.57	-0.16
207.0	5.87	-6.12	0.10	5.89	-6.57	-0.16
208.0	5.86	-6.08	0.16	5.88	-6.52	-0.09
209.0	5.87	-6.07	0.24	5.89	-6.51	-0.01
210.0	5.88	-6.07	0.27	5.90	-6.52	0.01
211.0	5.87	-6.04	0.22	5.89	-6.48	-0.03
212.0	5.87	-6.02	0.16	5.89	-6.47	-0.09
213.0	5.88	-6.01	0.11	5.89	-6.46	-0.15
214.0	5.91	-6.04	0.08	5.92	-6.49	-0.18
215.0	5.95	-6.08	0.12	5.96	-6.54	-0.14
216.0	5.96	-6.08	0.19	5.97	-6.53	-0.07
217.0	5.98	-6.09	0.20	5.99	-6.55	-0.06
218.0	5.98	-6.06	0.24	5.99	-6.52	-0.02
219.0	5.99	-6.05	0.25	6.00	-6.51	-0.01
220.0	6.00	-6.05	0.26	6.01	-6.50	-0.00
221.0	6.01	-6.04	0.25	6.02	-6.50	-0.01
222.0	6.02	-6.04	0.24	6.03	-6.50	-0.02
223.0	6.04	-6.05	0.20	6.04	-6.51	-0.06
224.0	6.04	-6.06	0.20	6.04	-6.53	-0.06
225.0	6.06	-6.06	0.20	6.06	-6.53	-0.06
226.0	6.07	-6.08	0.19	6.07	-6.55	-0.07
227.0	6.10	-6.09	0.19	6.10	-6.56	-0.07
228.0	6.12	-6.09	0.20	6.12	-6.56	-0.07
229.0	6.12	-6.08	0.19	6.11	-6.55	-0.07
230.0	6.10	-6.07	0.20	6.09	-6.54	-0.06
231.0	6.10	-6.07	0.21	6.09	-6.54	-0.06
232.0	6.12	-6.07	0.20	6.11	-6.54	-0.06
233.0	6.14	-6.07	0.19	6.13	-6.55	-0.07
234.0	6.17	-6.07	0.19	6.16	-6.54	-0.08
235.0	6.20	-6.05	0.20	6.19	-6.53	-0.07
236.0	6.22	-6.07	0.19	6.20	-6.55	-0.08
237.0	6.23	-6.07	0.20	6.22	-6.55	-0.07
238.0	6.24	-6.07	0.21	6.23	-6.55	-0.06
239.0	6.25	-6.08	0.19	6.23	-6.56	-0.07
240.0	6.25	-6.07	0.20	6.23	-6.56	-0.07

TABLE IX (U)

TIME SEC	EARTH-FIXED-ACCELERATION				SPACE-FIXED-ACCELERATION			
	DDXE M/SEC	DDYE M/SEC	DDZE M/SEC		DDXS M/SEC	DDYS M/SEC	DDZS M/SEC	
241.0	6.26	-6.05	0.21		6.24	-6.54	-0.06	
242.0	6.28	-6.05	0.22		6.26	-6.54	-0.05	
243.0	6.30	-6.08	0.21		6.28	-6.57	-0.06	
244.0	6.31	-6.09	0.20		6.29	-6.58	-0.07	
245.0	6.32	-6.08	0.21		6.29	-6.58	-0.06	
246.0	6.32	-6.11	0.20		6.29	-6.60	-0.07	
247.0	6.32	-6.12	0.20		6.29	-6.62	-0.07	
248.0	6.33	-6.12	0.21		6.30	-6.61	-0.06	
249.0	6.35	-6.11	0.21		6.32	-6.61	-0.07	
250.0	6.37	-6.10	0.21		6.34	-6.60	-0.07	
251.0	6.38	-6.08	0.21		6.35	-6.58	-0.06	
252.0	6.40	-6.08	0.22		6.36	-6.58	-0.05	
253.0	6.41	-6.10	0.21		6.37	-6.60	-0.07	
254.0	6.42	-6.12	0.20		6.39	-6.63	-0.07	
255.0	6.43	-6.13	0.21		6.39	-6.64	-0.06	
256.0	6.43	-6.15	0.21		6.39	-6.65	-0.06	
257.0	6.42	-6.15	0.21		6.38	-6.65	-0.06	
258.0	6.42	-6.13	0.21		6.38	-6.64	-0.06	
259.0	6.44	-6.13	0.21		6.40	-6.64	-0.07	
260.0	6.47	-6.14	0.21		6.43	-6.65	-0.07	
261.0	6.51	-6.16	0.21		6.46	-6.67	-0.07	
262.0	6.52	-6.16	0.22		6.48	-6.67	-0.06	
263.0	6.52	-6.15	0.22		6.48	-6.66	-0.06	
264.0	6.52	-6.13	0.22		6.47	-6.65	-0.06	
265.0	6.52	-6.13	0.21		6.48	-6.65	-0.07	
266.0	6.54	-6.14	0.22		6.49	-6.66	-0.06	
267.0	6.56	-6.16	0.21		6.51	-6.68	-0.07	
268.0	6.59	-6.16	0.22		6.53	-6.69	-0.06	
269.0	6.61	-6.16	0.23		6.55	-6.69	-0.05	
270.0	6.63	-6.16	0.22		6.57	-6.68	-0.06	
271.0	6.65	-6.16	0.22		6.59	-6.69	-0.07	
272.0	6.67	-6.17	0.21		6.61	-6.70	-0.07	
273.0	6.68	-6.16	0.21		6.62	-6.70	-0.07	
274.0	6.69	-6.16	0.22		6.63	-6.70	-0.06	
275.0	6.69	-6.18	0.23		6.63	-6.72	-0.05	
276.0	6.70	-6.19	0.23		6.63	-6.72	-0.05	
277.0	6.69	-6.19	0.23		6.63	-6.73	-0.06	
278.0	6.69	-6.18	0.22		6.63	-6.72	-0.06	
279.0	6.70	-6.17	0.22		6.63	-6.71	-0.06	
280.0	6.69	-6.18	0.21		6.63	-6.71	-0.07	

TABLE IX ( $\psi$ )

TIME SEC	EARTH-FIXED-ACCELERATION			SPACE-FIXED-ACCELERATION		
	DDXE M/SEC SQ	DDYE M/SEC SQ	DDZE M/SEC SQ	DDXS M/SEC SQ	DDYS M/SEC SQ	DDZS M/SEC SQ
281.0	6.67	-6.19	0.22	6.60	-6.73	-0.06
282.0	6.65	-6.20	0.22	6.58	-6.74	-0.07
283.0	6.66	-6.22	0.22	6.59	-6.76	-0.07
284.0	6.71	-6.22	0.21	6.64	-6.76	-0.07
285.0	6.77	-6.21	0.22	6.69	-6.75	-0.07
286.0	6.82	-6.19	0.23	6.74	-6.74	-0.06
287.0	6.84	-6.19	0.22	6.77	-6.74	-0.06
288.0	6.85	-6.20	0.23	6.77	-6.75	-0.06
289.0	6.86	-6.21	0.23	6.78	-6.76	-0.06
290.0	6.89	-6.23	0.23	6.81	-6.78	-0.06
291.0	6.90	-6.24	0.23	6.82	-6.79	-0.06
292.0	6.92	-6.23	0.23	6.83	-6.78	-0.06
293.0	6.93	-6.23	0.23	6.85	-6.79	-0.06
294.0	6.96	-6.23	0.22	6.87	-6.79	-0.07
295.0	6.96	-6.22	0.23	6.87	-6.79	-0.06
296.0	6.94	-6.21	0.24	6.86	-6.77	-0.05
297.0	6.94	-6.21	0.24	6.85	-6.78	-0.05
298.0	6.96	-6.23	0.23	6.87	-6.80	-0.06
299.0	6.99	-6.26	0.22	6.90	-6.82	-0.08
300.0	7.03	-6.25	0.22	6.94	-6.82	-0.07
301.0	7.05	-6.23	0.23	6.96	-6.81	-0.06
302.0	7.06	-6.22	0.24	6.96	-6.80	-0.05
303.0	7.06	-6.23	0.24	6.96	-6.81	-0.06
304.0	7.07	-6.26	0.23	6.97	-6.83	-0.07
305.0	7.10	-6.27	0.25	7.00	-6.85	-0.05
306.0	7.13	-6.29	0.19	7.03	-6.87	-0.11
307.0	7.14	-6.29	0.21	7.04	-6.87	-0.09
308.0	7.16	-6.28	0.25	7.05	-6.86	-0.05
309.0	7.16	-6.28	0.28	7.05	-6.86	-0.02
310.0	7.16	-6.27	0.28	7.05	-6.86	-0.02
311.0	7.16	-6.26	0.27	7.05	-6.85	-0.03
312.0	7.18	-6.28	0.23	7.07	-6.87	-0.07
313.0	7.22	-6.30	0.20	7.11	-6.89	-0.11
314.0	7.24	-6.31	0.19	7.13	-6.90	-0.11
315.0	7.24	-6.30	0.27	7.13	-6.89	-0.04
316.0	7.24	-6.30	0.25	7.13	-6.89	-0.05
317.0	7.24	-6.30	0.25	7.13	-6.90	-0.06
318.0	7.26	-6.32	0.24	7.14	-6.92	-0.06
319.0	7.30	-6.33	0.24	7.19	-6.94	-0.07
320.0	7.34	-6.34	0.23	7.22	-6.95	-0.08

TABLE IX (II)

TIME SEC	EARTH-FIXED-ACCELERATION				SPACE-FIXED-ACCELERATION			
	DDXE M/SEC	DDYE M/SEC	DDZE M/SEC		DDXS M/SEC	DDYS M/SEC	DDZS M/SEC	
SEC	SQ	SQ	SQ	SQ	SQ	SQ	SQ	SQ
321.0	7.36	-6.32	0.25		7.24	-6.93	-0.06	
322.0	7.38	-6.33	0.25		7.26	-6.93	-0.06	
323.0	7.38	-6.34	0.25		7.26	-6.95	-0.06	
324.0	7.39	-6.35	0.24		7.26	-6.96	-0.07	
325.0	7.41	-6.37	0.24		7.29	-6.98	-0.07	
326.0	7.45	-6.37	0.25		7.32	-6.98	-0.06	
327.0	7.47	-6.36	0.26		7.34	-6.97	-0.05	
328.0	7.48	-6.33	0.27		7.35	-6.94	-0.04	
329.0	7.49	-6.35	0.26		7.36	-6.97	-0.05	
330.0	7.50	-6.37	0.24		7.37	-6.99	-0.08	
331.0	7.51	-6.40	0.24		7.38	-7.02	-0.07	
332.0	7.54	-6.41	0.25		7.40	-7.04	-0.07	
333.0	7.57	-6.38	0.26		7.43	-7.01	-0.06	
334.0	7.60	-6.36	0.26		7.47	-6.98	-0.06	
335.0	7.62	-6.36	0.26		7.48	-6.99	-0.06	
336.0	7.63	-6.39	0.25		7.49	-7.02	-0.07	
337.0	7.63	-6.42	0.25		7.49	-7.05	-0.06	
338.0	7.63	-6.41	0.26		7.49	-7.04	-0.06	
339.0	7.63	-6.41	0.26		7.49	-7.05	-0.06	
340.0	7.63	-6.40	0.26		7.49	-7.04	-0.06	
341.0	7.66	-6.41	0.26		7.51	-7.05	-0.06	
342.0	7.68	-6.43	0.25		7.53	-7.07	-0.07	
343.0	7.70	-6.43	0.25		7.55	-7.08	-0.07	
344.0	7.73	-6.43	0.25		7.58	-7.07	-0.07	
345.0	7.76	-6.43	0.27		7.61	-7.08	-0.06	
346.0	7.79	-6.46	0.27		7.63	-7.11	-0.05	
347.0	7.79	-6.48	0.27		7.64	-7.13	-0.05	
348.0	7.81	-6.49	0.26		7.65	-7.14	-0.06	
349.0	7.82	-6.47	0.26		7.66	-7.12	-0.06	
350.0	7.84	-6.46	0.26		7.68	-7.11	-0.07	
351.0	7.86	-6.45	0.26		7.70	-7.11	-0.07	
352.0	7.89	-6.46	0.27		7.73	-7.12	-0.06	
353.0	7.90	-6.49	0.27		7.74	-7.15	-0.06	
354.0	7.91	-6.53	0.26		7.74	-7.19	-0.07	
355.0	7.92	-6.54	0.26		7.75	-7.20	-0.07	
356.0	7.94	-6.53	0.26		7.77	-7.20	-0.07	
357.0	7.97	-6.52	0.27		7.80	-7.19	-0.06	
358.0	8.01	-6.50	0.27		7.84	-7.17	-0.06	
359.0	8.04	-6.49	0.28		7.87	-7.16	-0.05	
360.0	8.06	-6.49	0.28		7.89	-7.16	-0.06	

TABLE IX (U)

TIME SEC	EARTH-FIXED-ACCELERATION			SPACE-FIXED-ACCELERATION		
	DDXE M/SEC SQ	DDYE M/SEC SQ	DDZE M/SEC SQ	DDXS M/SEC SQ	DDYS M/SEC SQ	DDZS M/SEC SQ
361.0	8.08	-6.50	0.27	7.90	-7.18	-0.06
362.0	8.08	-6.55	0.26	7.90	-7.23	-0.07
363.0	8.09	-6.57	0.27	7.91	-7.25	-0.07
364.0	8.10	-6.57	0.27	7.92	-7.25	-0.06
365.0	8.12	-6.55	0.28	7.94	-7.23	-0.06
366.0	8.13	-6.53	0.28	7.95	-7.22	-0.05
367.0	8.15	-6.54	0.28	7.97	-7.23	-0.06
368.0	8.17	-6.56	0.28	7.98	-7.25	-0.06
369.0	8.19	-6.59	0.28	8.00	-7.28	-0.06
370.0	8.20	-6.60	0.29	8.01	-7.29	-0.05
371.0	8.23	-6.62	0.28	8.04	-7.31	-0.06
372.0	8.25	-6.63	0.28	8.06	-7.33	-0.06
373.0	8.27	-6.66	0.27	8.08	-7.35	-0.07
374.0	8.28	-6.63	0.27	8.09	-7.33	-0.07
375.0	8.29	-6.62	0.28	8.09	-7.32	-0.07
376.0	8.30	-6.63	0.28	8.10	-7.33	-0.06
377.0	8.33	-6.65	0.28	8.13	-7.35	-0.06
378.0	8.34	-6.67	0.27	8.14	-7.38	-0.07
379.0	8.37	-6.70	0.26	8.16	-7.40	-0.08
380.0	8.38	-6.69	0.27	8.18	-7.40	-0.08
381.0	8.41	-6.69	0.27	8.20	-7.40	-0.07
382.0	8.42	-6.68	0.28	8.22	-7.40	-0.06
383.0	8.44	-6.71	0.28	8.24	-7.43	-0.07
384.0	8.46	-6.73	0.30	8.25	-7.45	-0.05
385.0	8.47	-6.74	0.31	8.26	-7.46	-0.04
386.0	8.49	-6.74	0.32	8.28	-7.46	-0.03
387.0	8.54	-6.75	0.32	8.32	-7.47	-0.03
388.0	8.56	-6.75	0.31	8.35	-7.47	-0.04
389.0	8.59	-6.77	0.29	8.37	-7.50	-0.06
390.0	8.60	-6.79	0.28	8.38	-7.52	-0.07
391.0	8.61	-6.81	0.29	8.39	-7.54	-0.07
392.0	8.63	-6.81	0.31	8.41	-7.54	-0.05
393.0	8.65	-6.79	0.31	8.43	-7.52	-0.05
394.0	8.69	-6.80	0.30	8.46	-7.54	-0.05
395.0	8.72	-6.80	0.29	8.50	-7.54	-0.06
396.0	8.77	-6.80	0.29	8.54	-7.54	-0.07
397.0	8.79	-6.82	0.28	8.56	-7.57	-0.08
398.0	8.79	-6.83	0.28	8.56	-7.58	-0.08
399.0	8.78	-6.84	0.30	8.55	-7.58	-0.06
400.0	8.78	-6.84	0.31	8.54	-7.59	-0.05

TABLE IX (U)

TIME SEC	EARTH-FIXED-ACCELERATION			SPACE-FIXED-ACCELERATION		
	DDXE M/SEC	DDYE M/SEC	DDZE M/SEC	DDXS M/SEC	DDYS M/SEC	DDZS M/SEC
SQ	SQ	SQ	SQ	SQ	SQ	SQ
401.0	8.80	-6.85	0.30	8.56	-7.60	-0.06
402.0	8.84	-6.88	0.30	8.61	-7.63	-0.07
403.0	8.89	-6.90	0.29	8.65	-7.66	-0.08
404.0	8.92	-6.92	0.28	8.68	-7.68	-0.08
405.0	8.94	-6.90	0.29	8.70	-7.66	-0.08
406.0	8.94	-6.87	0.31	8.70	-7.64	-0.06
407.0	8.93	-6.86	0.30	8.69	-7.63	-0.06
408.0	8.94	-6.88	0.30	8.69	-7.65	-0.06
409.0	8.96	-6.92	0.30	8.71	-7.69	-0.07
410.0	9.00	-6.95	0.29	8.75	-7.72	-0.08
411.0	9.06	-6.96	0.29	8.81	-7.74	-0.08
412.0	9.11	-6.95	0.30	8.85	-7.73	-0.07
413.0	9.13	-6.96	0.31	8.88	-7.74	-0.06
414.0	9.14	-6.98	0.31	8.88	-7.76	-0.06
415.0	9.14	-6.99	0.31	8.88	-7.78	-0.06
416.0	9.17	-7.01	0.31	8.91	-7.80	-0.06
417.0	9.21	-7.02	0.31	8.95	-7.80	-0.06
418.0	9.25	-7.03	0.31	8.99	-7.82	-0.06
419.0	9.28	-7.03	0.31	9.02	-7.83	-0.06
420.0	9.28	-7.02	0.31	9.01	-7.82	-0.07
421.0	9.31	-7.03	0.32	9.04	-7.83	-0.06
422.0	9.33	-7.05	0.32	9.06	-7.85	-0.06
423.0	9.37	-7.06	0.32	9.10	-7.86	-0.06
424.0	9.42	-7.08	0.31	9.15	-7.89	-0.07
425.0	9.45	-7.08	0.32	9.18	-7.89	-0.06
426.0	9.46	-7.08	0.31	9.19	-7.89	-0.07
427.0	9.46	-7.08	0.32	9.19	-7.89	-0.07
428.0	9.46	-7.11	0.32	9.19	-7.92	-0.06
429.0	9.48	-7.14	0.32	9.20	-7.96	-0.06
430.0	9.50	-7.15	0.32	9.22	-7.97	-0.06
431.0	9.54	-7.17	0.32	9.26	-7.99	-0.07
432.0	9.57	-7.18	0.32	9.28	-8.00	-0.07
433.0	9.60	-7.15	0.33	9.32	-7.98	-0.06
434.0	9.63	-7.15	0.33	9.34	-7.98	-0.06
435.0	9.65	-7.18	0.33	9.36	-8.01	-0.06
436.0	9.64	-7.20	0.32	9.35	-8.04	-0.07
437.0	9.65	-7.23	0.32	9.37	-8.09	-0.08
438.0	9.67	-7.25	0.31	9.37	-8.09	-0.08
439.0	9.70	-7.24	0.32	9.41	-8.07	-0.07
440.0	9.75	-7.22	0.33	9.45	-8.07	-0.07

TABLE IX (U)

TIME SEC	EARTH-FIXED-ACCELERATION			SPACE-FIXED-ACCELERATION		
	DDXE M/SEC SQ	DDYE M/SEC SQ	DDZE M/SEC SQ	DDXS M/SEC SQ	DDYS M/SEC SQ	DDZS M/SEC SQ
441.0	9.81	-7.24	0.33	9.51	-8.09	-0.06
442.0	9.86	-7.28	0.33	9.55	-8.13	-0.06
443.0	9.88	-7.29	0.34	9.58	-8.14	-0.06
444.0	9.91	-7.29	0.33	9.60	-8.14	-0.07
445.0	9.93	-7.31	0.33	9.62	-8.17	-0.07
446.0	9.96	-7.32	0.33	9.65	-8.18	-0.07
447.0	9.96	-7.33	0.33	9.65	-8.19	-0.07
448.0	10.00	-7.36	0.33	9.69	-8.23	-0.07
449.0	10.04	-7.36	0.34	9.73	-8.23	-0.07
450.0	10.07	-7.36	0.34	9.75	-8.23	-0.06
451.0	10.10	-7.38	0.34	9.78	-8.25	-0.07
452.0	10.12	-7.41	0.33	9.80	-8.28	-0.08
453.0	10.13	-7.41	0.33	9.81	-8.29	-0.07
454.0	10.16	-7.42	0.33	9.84	-8.30	-0.08
455.0	10.19	-7.45	0.34	9.86	-8.33	-0.07
456.0	10.23	-7.47	0.34	9.90	-8.35	-0.07
457.0	10.23	-7.48	0.34	9.90	-8.36	-0.07
458.0	10.25	-7.50	0.35	9.92	-8.39	-0.07
459.0	10.31	-7.51	0.34	9.98	-8.40	-0.07
460.0	10.35	-7.51	0.35	10.01	-8.41	-0.07
461.0	10.37	-7.51	0.35	10.04	-8.41	-0.07
462.0	10.38	-7.53	0.34	10.04	-8.43	-0.08
463.0	10.37	-7.55	0.34	10.03	-8.45	-0.07
464.0	10.39	-7.54	0.34	10.04	-8.45	-0.07
465.0	10.42	-7.56	0.35	10.08	-8.46	-0.07
466.0	10.49	-7.58	0.34	10.15	-8.49	-0.08
467.0	10.54	-7.58	0.34	10.19	-8.50	-0.08
468.0	10.55	-7.61	0.35	10.20	-8.52	-0.07
469.0	10.60	-7.62	0.36	10.25	-8.54	-0.06
470.0	10.64	-7.64	0.36	10.28	-8.57	-0.06
471.0	10.67	-7.66	0.36	10.31	-8.58	-0.06
472.0	10.68	-7.69	0.34	10.32	-8.61	-0.08
473.0	10.70	-7.70	0.35	10.34	-8.63	-0.08
474.0	10.73	-7.70	0.35	10.37	-8.63	-0.08
475.0	10.76	-7.72	0.35	10.40	-8.65	-0.08
476.0	10.79	-7.73	0.36	10.43	-8.66	-0.07
477.0	10.84	-7.75	0.36	10.47	-8.70	-0.07
478.0	10.86	-7.78	0.36	10.49	-8.72	-0.07
479.0	10.88	-7.80	0.36	10.51	-8.74	-0.07
480.0	10.90	-7.82	0.35	10.52	-8.77	-0.08

TABLE IX (U)

TIME SEC	EARTH-FIXED-ACCELERATION						SPACE-FIXED-ACCELERATION					
	DDXE M/SEC	DDYE M/SEC	DDZE M/SEC	DDXS M/SEC	DDYS M/SEC	DDZS M/SEC	DDXE SQ	DDYE SQ	DDZE SQ	DDXS SQ	DDYS SQ	DDZS SQ
481.0	10.95	-7.83	0.35	10.58	-8.78	-0.08						
482.0	11.02	-7.85	0.36	10.64	-8.81	-0.08						
483.0	11.06	-7.85	0.36	10.68	-8.81	-0.07						
484.0	11.11	-7.86	0.36	10.72	-8.82	-0.08						
485.0	11.12	-7.86	0.37	10.74	-8.83	-0.08						
486.0	11.12	-7.87	0.36	10.73	-8.84	-0.08						
487.0	11.14	-7.94	0.36	10.75	-8.91	-0.09						
488.0	11.20	-7.97	0.36	10.81	-8.94	-0.08						
489.0	11.26	-8.00	0.37	10.87	-8.98	-0.07						
490.0	11.28	-8.01	0.38	10.89	-8.99	-0.07						
491.0	11.30	-8.02	0.39	10.91	-9.00	-0.06						
492.0	11.35	-8.02	0.39	10.95	-9.01	-0.05						
493.0	11.37	-8.02	0.38	10.97	-9.00	-0.07						
494.0	11.41	-8.04	0.37	11.01	-9.03	-0.08						
495.0	11.46	-8.06	0.37	11.05	-9.06	-0.08						
496.0	11.49	-8.09	0.36	11.08	-9.09	-0.09						
497.0	11.53	-8.13	0.37	11.12	-9.13	-0.09						
498.0	11.59	-8.15	0.38	11.18	-9.16	-0.08						
499.0	11.62	-8.16	0.38	11.21	-9.17	-0.08						
500.0	11.65	-8.17	0.37	11.23	-9.18	-0.09						
501.0	11.70	-8.17	0.38	11.28	-9.19	-0.08						
502.0	11.73	-8.18	0.37	11.31	-9.20	-0.09						
503.0	11.75	-8.19	0.37	11.33	-9.21	-0.09						
504.0	11.79	-8.22	0.37	11.36	-9.24	-0.09						
505.0	11.84	-8.25	0.39	11.41	-9.27	-0.08						
506.0	11.88	-8.28	0.38	11.45	-9.31	-0.09						
507.0	11.89	-8.31	0.37	11.46	-9.34	-0.10						
508.0	11.92	-8.32	0.38	11.49	-9.36	-0.08						
509.0	11.95	-8.32	0.38	11.51	-9.36	-0.09						
510.0	11.99	-8.34	0.38	11.55	-9.38	-0.09						
511.0	12.07	-8.35	0.39	11.63	-9.40	-0.08						
512.0	12.15	-8.38	0.39	11.70	-9.43	-0.09						
513.0	12.17	-8.40	0.38	11.73	-9.46	-0.09						
514.0	12.21	-8.44	0.38	11.76	-9.50	-0.09						
515.0	12.23	-8.46	0.39	11.78	-9.53	-0.09						
516.0	12.27	-8.46	0.38	11.81	-9.53	-0.09						
517.0	12.32	-8.46	0.38	11.86	-9.53	-0.10						
518.0	12.36	-8.49	0.39	11.90	-9.56	-0.09						
519.0	12.41	-8.54	0.39	11.95	-9.62	-0.09						
520.0	12.47	-8.58	0.39	12.01	-9.66	-0.10						

TABLE IX (U)

TIME SEC	EARTH-FIXED-ACCELERATION			SPACE-FIXED-ACCELERATION		
	DDXE M/SEC SQ	DDYE M/SEC SQ	DDZE M/SEC SQ	DDXS M/SEC SQ	DDYS M/SEC SQ	DDZS M/SEC SQ
521.0	12.50	-8.61	0.39	12.03	-9.69	-0.10
522.0	12.56	-8.63	0.39	12.10	-9.72	-0.09
523.0	12.59	-8.65	0.39	12.12	-9.74	-0.10
524.0	12.60	-8.64	0.40	12.12	-9.73	-0.09
525.0	12.62	-8.66	0.40	12.14	-9.76	-0.09
526.0	12.66	-8.68	0.40	12.18	-9.78	-0.09
527.0	12.71	-8.69	0.40	12.23	-9.79	-0.09
528.0	12.76	-8.72	0.39	12.28	-9.83	-0.10
529.0	12.83	-8.78	0.39	12.34	-9.89	-0.11
530.0	12.89	-8.79	0.39	12.40	-9.91	-0.11
531.0	12.93	-8.82	0.38	12.44	-9.94	-0.12
532.0	12.97	-8.82	0.40	12.48	-9.94	-0.10
533.0	13.03	-8.84	0.41	12.53	-9.97	-0.09
534.0	13.06	-8.86	0.43	12.56	-10.00	-0.08
535.0	13.10	-8.90	0.43	12.60	-10.03	-0.08
536.0	13.14	-8.94	0.41	12.63	-10.08	-0.09
537.0	13.20	-8.95	0.40	12.69	-10.09	-0.11
538.0	13.25	-8.96	0.40	12.74	-10.11	-0.11
539.0	13.30	-9.00	0.40	12.79	-10.15	-0.11
540.0	13.35	-9.03	0.41	12.84	-10.19	-0.10
541.0	13.42	-9.09	0.40	12.90	-10.26	-0.11
542.0	13.46	-9.12	0.40	12.94	-10.28	-0.11
543.0	13.52	-9.13	0.42	13.00	-10.30	-0.10
544.0	13.56	-9.13	0.42	13.03	-10.31	-0.10
545.0	13.61	-9.13	0.42	13.08	-10.30	-0.10
546.0	13.63	-9.15	0.42	13.10	-10.33	-0.11
547.0	13.71	-9.16	0.42	13.18	-10.35	-0.10
548.0	13.76	-9.19	0.42	13.23	-10.38	-0.10
549.0	13.83	-9.21	0.43	13.29	-10.41	-0.10
550.0	13.88	-9.26	0.43	13.34	-10.45	-0.10
551.0	13.94	-9.32	0.42	13.40	-10.53	-0.11
552.0	14.00	-9.36	0.41	13.45	-10.57	-0.12
553.0	14.05	-9.38	0.42	13.50	-10.60	-0.12
554.0	14.09	-9.41	0.43	13.54	-10.62	-0.11
555.0	14.15	-9.41	0.44	13.60	-10.63	-0.09
556.0	14.19	-9.44	0.44	13.63	-10.67	-0.10
557.0	14.26	-9.47	0.44	13.69	-10.69	-0.10
558.0	14.29	-9.51	0.43	13.73	-10.74	-0.11
559.0	14.36	-9.55	0.43	13.79	-10.79	-0.12
560.0	14.43	-9.58	0.44	13.86	-10.82	-0.11

TABLE IX (U)

TIME SEC	EARTH-FIXED-ACCELERATION			SPACE-FIXED-ACCELERATION		
	DDXE M/SEC SQ	DDYE M/SEC SQ	DDZE M/SEC SQ	DDXS M/SEC SQ	DDYS M/SEC SQ	DDZS M/SEC SQ
561.0	14.51	-9.59	0.45	13.94	-10.84	-0.10
562.0	14.57	-9.63	0.45	13.99	-10.88	-0.10
563.0	14.62	-9.65	0.46	14.05	-10.91	-0.09
564.0	14.66	-9.68	0.45	14.07	-10.94	-0.10
565.0	14.71	-9.73	0.44	14.12	-10.99	-0.12
566.0	14.78	-9.78	0.43	14.19	-11.05	-0.13
567.0	14.85	-9.80	0.44	14.26	-11.07	-0.12
568.0	14.92	-9.83	0.44	14.33	-11.11	-0.12
569.0	14.96	-9.86	0.45	14.37	-11.15	-0.11
570.0	15.02	-9.93	0.45	14.42	-11.22	-0.12
571.0	15.08	-9.96	0.45	14.48	-11.25	-0.12
572.0	15.15	-9.99	0.42	14.54	-11.29	-0.14
573.0	15.21	-9.97	0.45	14.60	-11.27	-0.12
574.0	15.29	-9.96	0.47	14.68	-11.27	-0.10
575.0	15.38	-10.01	0.47	14.76	-11.33	-0.11
576.0	15.43	-10.08	0.46	14.81	-11.40	-0.12
577.0	15.49	-10.14	0.45	14.87	-11.46	-0.13
578.0	15.54	-10.20	0.45	14.91	-11.53	-0.13
579.0	15.61	-10.23	0.47	14.98	-11.57	-0.12
580.0	15.69	-10.26	0.48	15.05	-11.60	-0.10
581.0	15.76	-10.29	0.49	15.13	-11.63	-0.10
582.0	15.85	-10.37	0.47	15.21	-11.72	-0.12
583.0	15.89	-10.40	0.48	15.24	-11.76	-0.11
584.0	15.92	-10.43	0.49	15.27	-11.79	-0.10
585.0	15.97	-10.51	0.48	15.31	-11.87	-0.11
586.0	16.03	-10.56	0.49	15.37	-11.93	-0.10
587.0	16.13	-10.62	0.50	15.47	-12.00	-0.10
588.0	16.21	-10.68	0.50	15.54	-12.06	-0.10
589.0	16.30	-10.75	0.49	15.63	-12.13	-0.11
590.0	16.36	-10.79	0.48	15.68	-12.18	-0.13
591.0	16.40	-10.82	0.48	15.72	-12.22	-0.13
592.0	16.46	-10.90	0.47	15.77	-12.30	-0.14
593.0	16.52	-10.95	0.47	15.83	-12.36	-0.13
594.0	16.61	-10.99	0.49	15.92	-12.40	-0.12
595.0	16.68	-11.03	0.48	15.98	-12.45	-0.14
596.0	16.76	-11.07	0.47	16.06	-12.49	-0.14
597.0	16.83	-11.15	0.47	16.13	-12.58	-0.14
598.0	16.90	-11.27	0.47	16.19	-12.70	-0.14
599.0	17.00	-11.35	0.50	16.28	-12.79	-0.12
600.0	17.09	-11.42	0.50	16.37	-12.87	-0.12

TABLE IX (U)

TIME SEC	EARTH-FIXED-ACCELERATION			SPACE-FIXED-ACCELERATION		
	DDXE M/SEC SQ	DDYE M/SEC SQ	DDZE M/SEC SQ	DDXS M/SEC SQ	DDYS M/SEC SQ	DDZS M/SEC SQ
601.0	17.17	-11.46	0.51	16.45	-12.91	-0.11
602.0	17.22	-11.49	0.51	16.49	-12.95	-0.12
603.0	17.28	-11.53	0.50	16.55	-13.00	-0.13
604.0	17.34	-11.61	0.48	16.60	-13.08	-0.15
605.0	17.39	-11.67	0.47	16.65	-13.14	-0.16
606.0	17.47	-11.72	0.46	16.72	-13.20	-0.17
607.0	17.54	-11.75	0.46	16.79	-13.24	-0.18
608.0	17.63	-11.81	0.45	16.87	-13.30	-0.19
609.0	17.74	-11.87	0.47	16.98	-13.37	-0.17
610.0	17.80	-11.93	0.48	17.04	-13.43	-0.16
611.0	17.86	-12.00	0.48	17.09	-13.51	-0.16
612.0	17.91	-12.08	0.48	17.13	-13.59	-0.17
613.0	18.00	-12.15	0.48	17.22	-13.67	-0.16
614.0	18.10	-12.22	0.47	17.32	-13.75	-0.18
615.0	18.21	-12.28	0.48	17.42	-13.82	-0.17
616.0	18.29	-12.37	0.48	17.50	-13.91	-0.18
617.0	18.36	-12.43	0.47	17.56	-13.98	-0.19
618.0	18.44	-12.51	0.47	17.63	-14.07	-0.19
619.0	18.53	-12.59	0.47	17.72	-14.15	-0.20
620.0	18.62	-12.68	0.48	17.80	-14.25	-0.19
621.0	18.71	-12.76	0.48	17.89	-14.34	-0.18
622.0	18.80	-12.85	0.49	17.97	-14.43	-0.17
623.0	18.89	-12.93	0.49	18.05	-14.52	-0.18
624.0	18.98	-13.03	0.50	18.14	-14.63	-0.18
625.0	19.08	-13.12	0.49	18.23	-14.72	-0.18
626.0	19.18	-13.21	0.49	18.32	-14.82	-0.19
627.0	19.28	-13.30	0.48	18.42	-14.92	-0.20
628.0	19.38	-13.39	0.46	18.51	-15.02	-0.22
629.0	19.48	-13.49	0.45	18.60	-15.12	-0.24
S-IV CUTOFF SIGNAL						
629.970	19.59	-13.58	0.43	18.70	-15.22	-0.26
630.0	19.59	-13.58	0.43	18.71	-15.22	-0.26
631.0	-2.66	-7.67	0.38	-3.30	-8.45	0.12
632.0	-2.66	-7.66	0.38	-3.30	-8.44	0.11
633.0	-2.66	-7.66	0.38	-3.30	-8.43	0.11
634.0	-2.67	-7.65	0.38	-3.31	-8.43	0.11
635.0	-2.67	-7.65	0.38	-3.31	-8.43	0.11

TABLE IX (U)

TIME SEC	EARTH-FIXED-ACCELERATION			SPACE-FIXED-ACCELERATION		
	DDXE M/SEC SQ	DDYE M/SEC SQ	DDZE M/SEC SQ	DDXS M/SEC SQ	DDYS M/SEC SQ	DDZS M/SEC SQ
636.0	-2.67	-7.65	0.38	-3.31	-8.43	0.11
637.0	-2.67	-7.65	0.38	-3.31	-8.43	0.11
638.0	-2.67	-7.65	0.38	-3.32	-8.43	0.12
639.0	-2.67	-7.65	0.38	-3.32	-8.43	0.12
INSERTION						
639.970	-2.67	-7.65	0.38	-3.32	-8.43	0.12

TABLE X (U)

TIME SEC	ALTITUDE M	RANGE M	E.C.DIST. M	LATITUDE DEG	LONGITUDE DEG
<b>FIRST MOTION</b>					
0.310	32	0	6373337	28.53142	-80.56517
<b>LIFTOFF SIGNAL</b>					
0.410	32	0	6373337	28.53142	-80.56517
1.0	33	0	6373338	28.53142	-80.56517
2.0	37	0	6373342	28.53142	-80.56517
3.0	44	0	6373349	28.53142	-80.56516
4.0	55	1	6373360	28.53142	-80.56516
5.0	69	1	6373374	28.53143	-80.56516
6.0	87	1	6373392	28.53143	-80.56516
7.0	109	2	6373414	28.53143	-80.56517
8.0	134	-1	6373439	28.53144	-80.56517
9.0	164	-1	6373469	28.53144	-80.56517
10.0	197	-2	6373502	28.53145	-80.56517
11.0	234	-2	6373540	28.53145	-80.56517
12.0	276	-3	6373581	28.53145	-80.56517
13.0	322	-3	6373627	28.53146	-80.56518
14.0	373	-4	6373678	28.53146	-80.56518
15.0	427	-4	6373733	28.53146	-80.56519
16.0	487	-5	6373792	28.53146	-80.56520
17.0	551	-5	6373856	28.53147	-80.56520
18.0	620	-5	6373925	28.53146	-80.56521
19.0	694	-6	6373999	28.53146	-80.56522
20.0	773	-5	6374078	28.53146	-80.56522
21.0	857	-5	6374162	28.53145	-80.56522
22.0	945	-3	6374251	28.53144	-80.56520
23.0	1040	-1	6374345	28.53143	-80.56518
24.0	1139	2	6374444	28.53141	-80.56515
25.0	1244	7	6374549	28.53139	-80.56510
26.0	1354	14	6374659	28.53137	-80.56504
27.0	1470	23	6374775	28.53133	-80.56495
28.0	1590	35	6374896	28.53130	-80.56484
29.0	1717	49	6375022	28.53125	-80.56471
30.0	1849	66	6375154	28.53119	-80.56455

TABLE X (U)

TIME SEC	ALTITUDE M	RANGE M	E.C.DIST. M	LATITUDE DEG	LONGITUDE DEG
31.0	1986	86	6375291	28.53113	-80.56436
32.0	2129	109	6375435	28.53106	-80.56413
33.0	2278	135	6375584	28.53098	-80.56388
34.0	2433	166	6375739	28.53089	-80.56358
35.0	2594	200	6375899	28.53079	-80.56325
36.0	2761	239	6376066	28.53068	-80.56287
37.0	2933	282	6376239	28.53055	-80.56246
38.0	3112	330	6376418	28.53042	-80.56199
39.0	3297	382	6376603	28.53028	-80.56148
40.0	3488	439	6376794	28.53013	-80.56093
41.0	3685	501	6376991	28.52996	-80.56032
42.0	3889	569	6377195	28.52979	-80.55966
43.0	4099	641	6377405	28.52960	-80.55895
44.0	4315	719	6377621	28.52940	-80.55819
45.0	4539	802	6377845	28.52919	-80.55737
46.0	4769	891	6378075	28.52897	-80.55650
47.0	5005	985	6378311	28.52873	-80.55557
48.0	5249	1086	6378555	28.52848	-80.55459
49.0	5499	1191	6378806	28.52822	-80.55354
50.0	5757	1303	6379063	28.52795	-80.55244
51.0	6022	1422	6379328	28.52766	-80.55128
52.0	6293	1546	6379600	28.52736	-80.55005
53.0	6572	1678	6379879	28.52705	-80.54875
54.0	6858	1816	6380164	28.52672	-80.54739

## MACH ONE

54.693	7060	1916	6380367	28.52649	-80.54640
55.0	7150	1961	6380457	28.52638	-80.54596
56.0	7450	2114	6380757	28.52602	-80.54445
57.0	7756	2274	6381063	28.52565	-80.54287
58.0	8068	2441	6381375	28.52526	-80.54122
59.0	8387	2616	6381694	28.52486	-80.53949
60.0	8712	2799	6382020	28.52444	-80.53769
61.0	9045	2990	6382352	28.52400	-80.53580
62.0	9384	3189	6382691	28.52355	-80.53383
63.0	9730	3397	6383037	28.52308	-80.53177
64.0	10082	3615	6383390	28.52259	-80.52962
65.0	10443	3841	6383751	28.52209	-80.52737

TABLE X (U)

TIME SEC	ALTITUDE M	RANGE M	E.C.DIST. M	LATITUDE DEG	LØNGITUDE DEG
66.0	10810	4077	6384118	28.52156	-80.52503
67.0	11185	4323	6384493	28.52103	-80.52260
68.0	11568	4579	6384876	28.52047	-80.52006
69.0	11957	4844	6385266	28.51991	-80.51742
MAXIMUM DYNAMIC PRESSURE					
69.210	12040	4901	6385349	28.51979	-80.51686
70.0	12355	5120	6385664	28.51933	-80.51468
71.0	12760	5407	6386069	28.51872	-80.51183
72.0	13174	5705	6386484	28.51809	-80.50887
73.0	13598	6016	6386907	28.51743	-80.50578
74.0	14030	6339	6387340	28.51674	-80.50258
75.0	14471	6674	6387781	28.51603	-80.49925
76.0	14920	7022	6388230	28.51529	-80.49580
77.0	15378	7383	6388689	28.51452	-80.49221
78.0	15845	7758	6389156	28.51372	-80.48849
79.0	16322	8147	6389632	28.51289	-80.48462
80.0	16807	8551	6390118	28.51203	-80.48062
81.0	17302	8969	6390613	28.51113	-80.47647
82.0	17806	9403	6391117	28.51020	-80.47216
83.0	18319	9852	6391631	28.50924	-80.46770
84.0	18842	10318	6392155	28.50823	-80.46308
85.0	19375	10800	6392688	28.50719	-80.45830
86.0	19918	11299	6393231	28.50612	-80.45335
87.0	20470	11816	6393784	28.50500	-80.44822
88.0	21033	12351	6394347	28.50383	-80.44292
89.0	21606	12904	6394920	28.50263	-80.43744
90.0	22189	13475	6395503	28.50138	-80.43178
91.0	22782	14066	6396097	28.50009	-80.42592
92.0	23386	14676	6396702	28.49875	-80.41988
93.0	24001	15306	6397317	28.49737	-80.41364
94.0	24626	15957	6397943	28.49594	-80.40719
95.0	25262	16628	6398579	28.49446	-80.40055
96.0	25909	17320	6399227	28.49293	-80.39369
97.0	26568	18034	6399885	28.49135	-80.38662
98.0	27237	18770	6400555	28.48971	-80.37934
99.0	27917	19529	6401236	28.48803	-80.37183
100.0	28609	20310	6401928	28.48628	-80.36409

TABLE X (U)

TIME SEC	ALTITUDE M	RANGE M	E.C.DIST. M	LATITUDE DEG	LONGITUDE DEG
101.0	29312	21115	6402632	28.48448	-80.35613
102.0	30027	21944	6403348	28.48263	-80.34793
103.0	30753	22797	6404074	28.48072	-80.33949
104.0	31491	23675	6404813	28.47875	-80.33081
105.0	32242	24577	6405564	28.47673	-80.32188
106.0	33003	25505	6406326	28.47464	-80.31270
107.0	33777	26460	6407101	28.47250	-80.30327
108.0	34564	27440	6407888	28.47029	-80.29357
109.0	35362	28448	6408687	28.46803	-80.28360
110.0	36173	29483	6409499	28.46569	-80.27337
111.0	36996	30547	6410323	28.46329	-80.26286
112.0	37832	31638	6411159	28.46082	-80.25206
113.0	38681	32759	6412009	28.45829	-80.24099
114.0	39542	33909	6412871	28.45569	-80.22962
115.0	40416	35090	6413746	28.45302	-80.21795
116.0	41303	36301	6414634	28.45028	-80.20598
117.0	42203	37543	6415535	28.44746	-80.19370
118.0	43116	38818	6416449	28.44457	-80.18111
119.0	44043	40124	6417376	28.44161	-80.16820
120.0	44982	41464	6418316	28.43856	-80.15496
121.0	45934	42838	6419270	28.43544	-80.14139
122.0	46900	44246	6420237	28.43224	-80.12748
123.0	47880	45689	6421217	28.42895	-80.11323
124.0	48873	47168	6422211	28.42558	-80.09862
125.0	49879	48684	6423219	28.42212	-80.08366
126.0	50899	50236	6424240	28.41858	-80.06833
127.0	51933	51827	6425275	28.41494	-80.05263
128.0	52981	53456	6426324	28.41121	-80.03654
129.0	54042	55124	6427386	28.40739	-80.02007
130.0	55118	56833	6428463	28.40347	-80.00321
131.0	56207	58583	6429554	28.39945	-79.98594
132.0	57311	60375	6430659	28.39533	-79.96826
133.0	58429	62209	6431778	28.39111	-79.95016
134.0	59562	64087	6432912	28.38678	-79.93164
135.0	60710	66009	6434062	28.38235	-79.91268
136.0	61874	67976	6435227	28.37780	-79.89328
137.0	63054	69989	6436409	28.37315	-79.87343
138.0	64251	72049	6437608	28.36838	-79.85312
139.0	65467	74158	6438825	28.36350	-79.83232
140.0	66699	76314	6440059	28.35850	-79.81107

TABLE X (U)

TIME SEC	ALTITUDE M	RANGE M	E.C.DIST. M	LATITUDE DEG	LØNGITUDE DEG
IECØ SIGNAL					
140.750	67591	77978	6440952	28.35465	-79.79467
141.0	67946	78511	6441307	28.35339	-79.78942
142.0	69206	80747	6442569	28.34819	-79.76738
143.0	70474	83014	6443839	28.34292	-79.74505
144.0	71749	85307	6445115	28.33758	-79.72245
145.0	73030	87626	6446398	28.33216	-79.69961
146.0	74318	89968	6447688	28.32668	-79.67654
ØECØ SIGNAL					
146.730	75211	91699	6448582	28.32264	-79.65949
147.0	75609	92331	6448981	28.32114	-79.65327
SEPARATION SIGNAL					
147.140	75789	92662	6449161	28.32036	-79.65001
148.0	76904	94714	6450277	28.31557	-79.62980
S-IV IGNITION SIGNAL					
148.840	77982	96712	6451356	28.31089	-79.61012
149.0	78186	97093	6451561	28.31000	-79.60638
150.0	79460	99472	6452836	28.30443	-79.58295
151.0	80725	101850	6454103	28.29885	-79.55954
152.0	81984	104230	6455364	28.29326	-79.53611
153.0	83240	106615	6456621	28.28764	-79.51265
154.0	84491	109005	6457874	28.28201	-79.48913
155.0	85736	111401	6459122	28.27636	-79.46556
156.0	86977	113801	6460364	28.27069	-79.44195
157.0	88212	116205	6461600	28.26501	-79.41830
158.0	89441	118614	6462832	28.25931	-79.39461
159.0	90666	121028	6464058	28.25360	-79.37087
160.0	91886	123446	6465280	28.24786	-79.34710

TABLE X (U)

TIME SEC	ALTITUDE M	RANGE M	E.C.DIST. M	LATITUDE DEG	LONGITUDE DEG
161.0	93100	125869	6466496	28.24212	-79.32328
162.0	94309	128296	6467707	28.23635	-79.29942
163.0	95513	130728	6468913	28.23057	-79.27552
164.0	96712	133165	6470113	28.22477	-79.25157
165.0	97906	135606	6471309	28.21895	-79.22758
166.0	99095	138052	6472500	28.21311	-79.20356
167.0	100279	140502	6473686	28.20726	-79.17948
168.0	101457	142957	6474866	28.20139	-79.15537
169.0	102631	145417	6476042	28.19551	-79.13122
170.0	103800	147881	6477212	28.18960	-79.10702
171.0	104964	150350	6478378	28.18368	-79.08278
172.0	106123	152824	6479539	28.17775	-79.05850
173.0	107276	155302	6480694	28.17179	-79.03417
174.0	108425	157785	6481845	28.16582	-79.00980
175.0	109569	160273	6482991	28.15983	-78.98539
176.0	110708	162766	6484132	28.15382	-78.96094
177.0	111842	165263	6485268	28.14780	-78.93644
178.0	112971	167765	6486398	28.14176	-78.91189
179.0	114095	170272	6487525	28.13570	-78.88731
180.0	115215	172783	6488646	28.12962	-78.86268
181.0	116329	175299	6489762	28.12352	-78.83801
182.0	117438	177821	6490873	28.11741	-78.81330
183.0	118542	180346	6491979	28.11127	-78.78854
184.0	119642	182877	6493081	28.10512	-78.76374
185.0	120737	185413	6494177	28.09895	-78.73889
186.0	121827	187953	6495269	28.09277	-78.71400
187.0	122912	190498	6496356	28.08656	-78.68907
188.0	123992	193048	6497438	28.08034	-78.66409
189.0	125067	195603	6498516	28.07410	-78.63907
190.0	126138	198163	6499588	28.06784	-78.61400
191.0	127204	200727	6500656	28.06156	-78.58889
192.0	128265	203297	6501719	28.05527	-78.56373
193.0	129321	205871	6502777	28.04895	-78.53854
194.0	130372	208451	6503831	28.04262	-78.51329
195.0	131419	211035	6504879	28.03627	-78.48800
196.0	132461	213624	6505923	28.02990	-78.46267
197.0	133498	216219	6506962	28.02351	-78.43729
198.0	134530	218818	6507996	28.01710	-78.41186
199.0	135557	221422	6509025	28.01068	-78.38639
200.0	136579	224032	6510050	28.00423	-78.36087

TABLE X (U)

TIME SEC	ALTITUDE M	RANGE M	E.C.DIST. M	LATITUDE DEG	LØNGITUDE DEG
201.0	137597	226646	6511069	27.99777	-78.33531
202.0	138610	229266	6512084	27.99128	-78.30970
203.0	139618	231891	6513094	27.98478	-78.28404
204.0	140621	234520	6514100	27.97826	-78.25834
205.0	141620	237155	6515101	27.97172	-78.23260
206.0	142615	239795	6516097	27.96516	-78.20680
207.0	143604	242440	6517089	27.95858	-78.18096
208.0	144589	245090	6518075	27.95198	-78.15508
209.0	145568	247745	6519057	27.94537	-78.12915
210.0	146544	250406	6520034	27.93873	-78.10317
211.0	147514	253071	6521007	27.93207	-78.07714
212.0	148480	255742	6521975	27.92540	-78.05107
213.0	149441	258418	6522938	27.91870	-78.02495
214.0	150398	261099	6523897	27.91199	-77.99878
215.0	151350	263786	6524851	27.90525	-77.97256
216.0	152297	266477	6525800	27.89850	-77.94630
217.0	153240	269174	6526745	27.89173	-77.91999
218.0	154178	271877	6527685	27.88493	-77.89363
219.0	155110	274585	6528619	27.87811	-77.86722
220.0	156037	277299	6529549	27.87127	-77.84076
221.0	156960	280019	6530473	27.86441	-77.81424
222.0	157878	282743	6531394	27.85753	-77.78768
223.0	158794	285473	6532312	27.85063	-77.76108
224.0	159705	288207	6533225	27.84371	-77.73443
225.0	160611	290947	6534133	27.83677	-77.70774
226.0	161512	293693	6535037	27.82981	-77.68099
227.0	162409	296444	6535936	27.82283	-77.65419
228.0	163301	299200	6536830	27.81583	-77.62735
229.0	164189	301962	6537720	27.80881	-77.60046
230.0	165072	304729	6538605	27.80176	-77.57351
231.0	165951	307502	6539486	27.79470	-77.54652
232.0	166825	310280	6540362	27.78762	-77.51948
233.0	167694	313064	6541234	27.78051	-77.49238
234.0	168559	315853	6542101	27.77338	-77.46524
235.0	169420	318648	6542964	27.76623	-77.43805
236.0	170276	321449	6543823	27.75906	-77.41081
237.0	171128	324255	6544676	27.75187	-77.38352
238.0	171975	327066	6545526	27.74465	-77.35618
239.0	172818	329884	6546371	27.73742	-77.32878
240.0	173656	332707	6547211	27.73016	-77.30134

TABLE X (U)

TIME SEC	ALTITUDE M	RANGE M	E.C.DIST. M	LATITUDE DEG	LONGITUDE DEG
241.0	174489	335536	6548047	27.72288	-77.27385
242.0	175319	338370	6548879	27.71558	-77.24630
243.0	176144	341210	6549706	27.70826	-77.21870
244.0	176964	344056	6550528	27.70091	-77.19105
245.0	177780	346907	6551347	27.69355	-77.16335
246.0	178592	349765	6552161	27.68616	-77.13560
247.0	179399	352628	6552970	27.67874	-77.10780
248.0	180202	355496	6553775	27.67131	-77.07995
249.0	181000	358371	6554576	27.66386	-77.05204
250.0	181794	361251	6555372	27.65637	-77.02408
251.0	182583	364138	6556164	27.64887	-76.99607
252.0	183369	367030	6556951	27.64135	-76.96801
253.0	184149	369928	6557734	27.63380	-76.93989
254.0	184926	372831	6558513	27.62624	-76.91173
255.0	185698	375741	6559288	27.61864	-76.88351
256.0	186465	378657	6560058	27.61103	-76.85523
257.0	187229	381578	6560823	27.60339	-76.82691
258.0	187988	384506	6561585	27.59573	-76.79853
259.0	188742	387439	6562342	27.58804	-76.77010
260.0	189493	390378	6563094	27.58034	-76.74161
261.0	190238	393323	6563843	27.57261	-76.71308
262.0	190980	396275	6564586	27.56485	-76.68448
263.0	191717	399232	6565326	27.55707	-76.65584
264.0	192450	402195	6566061	27.54927	-76.62714
265.0	193179	405164	6566792	27.54145	-76.59839
266.0	193903	408140	6567519	27.53360	-76.56958
267.0	194623	411121	6568242	27.52573	-76.54072
268.0	195339	414109	6568960	27.51783	-76.51181
269.0	196051	417102	6569674	27.50991	-76.48284
270.0	196758	420102	6570384	27.50197	-76.45382
271.0	197461	423108	6571089	27.49400	-76.42474
272.0	198160	426120	6571790	27.48601	-76.39560
273.0	198854	429139	6572487	27.47799	-76.36642
274.0	199545	432163	6573180	27.46995	-76.33717
275.0	200231	435194	6573869	27.46188	-76.30787
276.0	200913	438231	6574553	27.45379	-76.27851
277.0	201590	441275	6575233	27.44567	-76.24910
278.0	202264	444324	6575909	27.43754	-76.21964
279.0	202933	447380	6576581	27.42937	-76.19012
280.0	203598	450442	6577249	27.42118	-76.16054

TABLE X (U)

TIME SEC	ALTITUDE M	RANGE M	E.C.DIST. M	LATITUDE DEG	LONGITUDE DEG
281.0	204259	453511	6577912	27.41296	-76.13091
282.0	204915	456585	6578571	27.40473	-76.10122
283.0	205568	459666	6579226	27.39646	-76.07147
284.0	206216	462753	6579877	27.38817	-76.04167
285.0	206861	465847	6580524	27.37986	-76.01182
286.0	207501	468947	6581167	27.37152	-75.98190
287.0	208137	472053	6581805	27.36315	-75.95194
288.0	208768	475166	6582439	27.35476	-75.92191
289.0	209396	478285	6583070	27.34635	-75.89183
290.0	210020	481411	6583696	27.33791	-75.86169
291.0	210639	484543	6584318	27.32944	-75.83149
292.0	211255	487682	6584936	27.32094	-75.80123
293.0	211866	490827	6585550	27.31243	-75.77092
294.0	212473	493979	6586160	27.30388	-75.74055
295.0	213077	497138	6586766	27.29531	-75.71012
296.0	213676	500303	6587368	27.28671	-75.67963
297.0	214271	503474	6587965	27.27808	-75.64908
298.0	214862	506653	6588559	27.26943	-75.61848
299.0	215449	509838	6589149	27.26075	-75.58781
300.0	216032	513029	6589735	27.25205	-75.55709
301.0	216611	516227	6590317	27.24332	-75.52631
302.0	217187	519432	6590894	27.23456	-75.49547
303.0	217758	522644	6591468	27.22577	-75.46457
304.0	218325	525863	6592038	27.21696	-75.43361
305.0	218888	529088	6592604	27.20812	-75.40259
306.0	219447	532320	6593166	27.19925	-75.37151
307.0	220002	535559	6593724	27.19036	-75.34037
308.0	220554	538805	6594278	27.18144	-75.30917
309.0	221101	542057	6594828	27.17249	-75.27792
310.0	221645	545317	6595374	27.16351	-75.24660
311.0	222184	548583	6595916	27.15451	-75.21522
312.0	222720	551856	6596455	27.14548	-75.18377
313.0	223251	555136	6596989	27.13642	-75.15227
314.0	223779	558423	6597520	27.12733	-75.12071
315.0	224303	561717	6598047	27.11821	-75.08909
316.0	224823	565018	6598569	27.10907	-75.05740
317.0	225339	568326	6599088	27.09989	-75.02566
318.0	225852	571642	6599604	27.09069	-74.99385
319.0	226360	574964	6600115	27.08146	-74.96198
320.0	226865	578293	6600622	27.07220	-74.93005

TABLE X (U)

TIME SEC	ALTITUDE M	RANGE M	E.C.DIST. M	LATITUDE DEG	LONGITUDE DEG
321.0	227366	581629	6601126	27.06291	-74.89806
322.0	227863	584972	6601626	27.05360	-74.86600
323.0	228356	588323	6602122	27.04425	-74.83388
324.0	228845	591680	6602614	27.03488	-74.80170
325.0	229331	595045	6603102	27.02548	-74.76946
326.0	229813	598417	6603587	27.01604	-74.73715
327.0	230290	601797	6604068	27.00658	-74.70478
328.0	230765	605183	6604545	26.99709	-74.67235
329.0	231235	608577	6605018	26.98757	-74.63985
330.0	231702	611978	6605488	26.97802	-74.60729
331.0	232165	615387	6605954	26.96844	-74.57466
332.0	232624	618802	6606416	26.95882	-74.54197
333.0	233079	622226	6606874	26.94918	-74.50922
334.0	233531	625656	6607329	26.93951	-74.47640
335.0	233979	629094	6607780	26.92981	-74.44352
336.0	234424	632540	6608227	26.92008	-74.41057
337.0	234865	635993	6608671	26.91031	-74.37756
338.0	235302	639453	6609111	26.90052	-74.34448
339.0	235735	642921	6609548	26.89070	-74.31134
340.0	236165	646396	6609980	26.88084	-74.27813
341.0	236591	649879	6610409	26.87096	-74.24485
342.0	237014	653370	6610835	26.86104	-74.21151
343.0	237432	656868	6611257	26.85109	-74.17811
344.0	237848	660373	6611675	26.84111	-74.14464
345.0	238259	663886	6612090	26.83110	-74.11110
346.0	238667	667407	6612501	26.82106	-74.07750
347.0	239072	670936	6612909	26.81099	-74.04383
348.0	239473	674472	6613313	26.80088	-74.01009
349.0	239870	678016	6613713	26.79075	-73.97628
350.0	240264	681568	6614110	26.78058	-73.94241
351.0	240654	685127	6614503	26.77037	-73.90847
352.0	241041	688694	6614893	26.76014	-73.87447
353.0	241424	692269	6615279	26.74987	-73.84039
354.0	241804	695852	6615662	26.73958	-73.80625
355.0	242180	699443	6616042	26.72924	-73.77204
356.0	242553	703041	6616417	26.71888	-73.73776
357.0	242922	706648	6616790	26.70849	-73.70342
358.0	243288	710262	6617159	26.69806	-73.66900
359.0	243650	713885	6617524	26.68759	-73.63452
360.0	244009	717515	6617886	26.67710	-73.59996

TABLE X (U)

TIME SEC	ALTITUDE M	RANGE M	E.C.DIST. M	LATITUDE DEG	LONGITUDE DEG
361.0	244364	721153	6618245	26.66657	-73.56534
362.0	244717	724800	6618600	26.65601	-73.53065
363.0	245065	728454	6618952	26.64541	-73.49589
364.0	245410	732117	6619300	26.63478	-73.46106
365.0	245752	735788	6619645	26.62412	-73.42616
366.0	246091	739467	6619987	26.61342	-73.39118
367.0	246426	743154	6620325	26.60269	-73.35614
368.0	246757	746849	6620660	26.59192	-73.32103
369.0	247086	750552	6620992	26.58112	-73.28585
370.0	247411	754263	6621320	26.57029	-73.25060
371.0	247733	757983	6621645	26.55942	-73.21527
372.0	248051	761711	6621967	26.54851	-73.17988
373.0	248366	765447	6622285	26.53758	-73.14441
374.0	248678	769192	6622600	26.52660	-73.10887
375.0	248986	772945	6622912	26.51559	-73.07326
376.0	249292	776706	6623220	26.50455	-73.03758
377.0	249593	780476	6623526	26.49347	-73.00183
378.0	249892	784254	6623828	26.48236	-72.96600
379.0	250188	788040	6624126	26.47121	-72.93011
380.0	250480	791835	6624422	26.46002	-72.89413
381.0	250768	795639	6624714	26.44880	-72.85809
382.0	251054	799451	6625003	26.43754	-72.82198
383.0	251336	803271	6625289	26.42625	-72.78579
384.0	251616	807100	6625571	26.41492	-72.74953
385.0	251892	810937	6625851	26.40356	-72.71319
386.0	252164	814784	6626127	26.39215	-72.67678
387.0	252434	818638	6626400	26.38071	-72.64030
388.0	252701	822502	6626670	26.36924	-72.60374
389.0	252964	826374	6626937	26.35773	-72.56711
390.0	253224	830255	6627200	26.34618	-72.53041
391.0	253481	834144	6627461	26.33459	-72.49362
392.0	253735	838042	6627718	26.32296	-72.45677
393.0	253985	841950	6627972	26.31130	-72.41984
394.0	254233	845866	6628223	26.29960	-72.38284
395.0	254478	849790	6628471	26.28786	-72.34575
396.0	254719	853724	6628716	26.27609	-72.30860
397.0	254957	857667	6628958	26.26427	-72.27136
398.0	255193	861618	6629197	26.25242	-72.23405
399.0	255425	865579	6629433	26.24053	-72.19667
400.0	255654	869548	6629666	26.22860	-72.15921

TABLE X (U)

TIME SEC	ALTITUDE M	RANGE M	E.C.DIST. M	LATITUDE DEG	LONGITUDE DEG
401.0	255881	873527	6629896	26.21664	-72.12167
402.0	256104	877515	6630122	26.20463	-72.08405
403.0	256324	881511	6630346	26.19258	-72.04636
404.0	256542	885517	6630567	26.18050	-72.00859
405.0	256756	889532	6630785	26.16838	-71.97074
406.0	256967	893556	6631000	26.15621	-71.93281
407.0	257176	897589	6631212	26.14401	-71.89481
408.0	257381	901632	6631421	26.13177	-71.85673
409.0	257584	905683	6631628	26.11949	-71.81857
410.0	257784	909744	6631831	26.10717	-71.78033
411.0	257981	913814	6632032	26.09481	-71.74201
412.0	258175	917894	6632230	26.08241	-71.70362
413.0	258366	921982	6632424	26.06997	-71.66514
414.0	258554	926081	6632616	26.05748	-71.62658
415.0	258740	930188	6632806	26.04496	-71.58795
416.0	258922	934306	6632992	26.03240	-71.54923
417.0	259102	938432	6633176	26.01979	-71.51044
418.0	259279	942568	6633356	26.00715	-71.47156
419.0	259454	946714	6633534	25.99446	-71.43261
420.0	259625	950869	6633710	25.98173	-71.39357
421.0	259794	955034	6633882	25.96896	-71.35445
422.0	259960	959209	6634052	25.95615	-71.31525
423.0	260123	963393	6634219	25.94329	-71.27597
424.0	260283	967587	6634383	25.93039	-71.23660
425.0	260441	971791	6634545	25.91745	-71.19716
426.0	260597	976004	6634704	25.90447	-71.15763
427.0	260749	980228	6634860	25.89145	-71.11802
428.0	260899	984461	6635014	25.87838	-71.07832
429.0	261046	988704	6635165	25.86527	-71.03854
430.0	261191	992957	6635314	25.85211	-70.99868
431.0	261333	997220	6635460	25.83891	-70.95874
432.0	261472	1001492	6635603	25.82567	-70.91871
433.0	261609	1005775	6635743	25.81239	-70.87860
434.0	261743	1010068	6635882	25.79906	-70.83840
435.0	261875	1014371	6636017	25.78568	-70.79812
436.0	262004	1018684	6636150	25.77227	-70.75776
437.0	262131	1023007	6636281	25.75880	-70.71731
438.0	262255	1027340	6636409	25.74530	-70.67677
439.0	262376	1031683	6636535	25.73175	-70.63616
440.0	262495	1036036	6636658	25.71815	-70.59545

TABLE X (U)

TIME SEC	ALTITUDE M	RANGE M	E.C.DIST. M	LATITUDE DEG	LONGITUDE DEG
441.0	262612	1040400	6636778	25.70451	-70.55466
442.0	262726	1044774	6636896	25.69083	-70.51379
443.0	262838	1049158	6637012	25.67710	-70.47282
444.0	262947	1053552	6637126	25.66332	-70.43178
445.0	263054	1057957	6637236	25.64949	-70.39064
446.0	263159	1062373	6637345	25.63563	-70.34942
447.0	263261	1066799	6637451	25.62171	-70.30811
448.0	263360	1071235	6637555	25.60775	-70.26671
449.0	263458	1075682	6637657	25.59374	-70.22522
450.0	263553	1080139	6637756	25.57969	-70.18365
451.0	263646	1084607	6637853	25.56558	-70.14199
452.0	263736	1089086	6637947	25.55143	-70.10023
453.0	263824	1093575	6638040	25.53724	-70.05840
454.0	263910	1098075	6638130	25.52299	-70.01647
455.0	263994	1102586	6638218	25.50870	-69.97445
456.0	264075	1107107	6638303	25.49436	-69.93234
457.0	264154	1111640	6638386	25.47998	-69.89014
458.0	264231	1116183	6638468	25.46554	-69.84785
459.0	264306	1120737	6638546	25.45105	-69.80548
460.0	264379	1125301	6638623	25.43652	-69.76301
461.0	264449	1129877	6638698	25.42194	-69.72045
462.0	264517	1134464	6638770	25.40731	-69.67780
463.0	264583	1139062	6638841	25.39263	-69.63506
464.0	264647	1143671	6638909	25.37790	-69.59222
465.0	264709	1148291	6638975	25.36312	-69.54930
466.0	264769	1152922	6639039	25.34829	-69.50628
467.0	264826	1157564	6639101	25.33341	-69.46317
468.0	264882	1162217	6639161	25.31849	-69.41997
469.0	264936	1166881	6639219	25.30351	-69.37668
470.0	264987	1171557	6639275	25.28848	-69.33329
471.0	265037	1176244	6639329	25.27340	-69.28981
472.0	265085	1180943	6639381	25.25826	-69.24623
473.0	265130	1185652	6639431	25.24308	-69.20257
474.0	265174	1190373	6639479	25.22785	-69.15880
475.0	265216	1195106	6639526	25.21256	-69.11495
476.0	265256	1199850	6639570	25.19723	-69.07100
477.0	265294	1204606	6639612	25.18184	-69.02695
478.0	265330	1209373	6639653	25.16639	-68.98281
479.0	265364	1214152	6639692	25.15090	-68.93857
480.0	265397	1218942	6639729	25.13535	-68.89424

TABLE X (U)

TIME SEC	ALTITUDE M	RANGE M	E.C.DIST. M	LATITUDE DEG	LONGITUDE DEG
481.0	265428	1223744	6639764	25.11975	-68.84981
482.0	265456	1228558	6639797	25.10410	-68.80528
483.0	265483	1233383	6639829	25.08840	-68.76066
484.0	265508	1238221	6639858	25.07264	-68.71594
485.0	265532	1243070	6639886	25.05682	-68.67112
486.0	265554	1247931	6639913	25.04095	-68.62621
487.0	265574	1252804	6639937	25.02503	-68.58119
488.0	265592	1257690	6639960	25.00905	-68.53608
489.0	265609	1262587	6639982	24.99302	-68.49087
490.0	265624	1267496	6640001	24.97694	-68.44556
491.0	265637	1272417	6640019	24.96080	-68.40015
492.0	265649	1277351	6640035	24.94460	-68.35465
493.0	265659	1282296	6640050	24.92835	-68.30904
494.0	265667	1287254	6640063	24.91204	-68.26333
495.0	265674	1292224	6640075	24.89567	-68.21752
496.0	265679	1297207	6640085	24.87925	-68.17161
497.0	265683	1302201	6640093	24.86278	-68.12560
498.0	265685	1307209	6640100	24.84624	-68.07949
499.0	265686	1312228	6640105	24.82965	-68.03328
500.0	265685	1317261	6640109	24.81300	-67.98696
501.0	265683	1322306	6640112	24.79629	-67.94055
502.0	265679	1327363	6640113	24.77953	-67.89402
503.0	265674	1332433	6640113	24.76271	-67.84740
504.0	265667	1337516	6640111	24.74583	-67.80067
505.0	265660	1342611	6640108	24.72889	-67.75384
506.0	265651	1347720	6640104	24.71189	-67.70691
507.0	265640	1352841	6640098	24.69483	-67.65987
508.0	265628	1357975	6640091	24.67772	-67.61272
509.0	265615	1363121	6640083	24.66054	-67.56547
510.0	265601	1368281	6640074	24.64331	-67.51812
511.0	265585	1373454	6640063	24.62601	-67.47066
512.0	265569	1378640	6640051	24.60866	-67.42309
513.0	265551	1383839	6640038	24.59124	-67.37542
514.0	265532	1389051	6640024	24.57376	-67.32764
515.0	265511	1394276	6640009	24.55623	-67.27976
516.0	265490	1399515	6639992	24.53863	-67.23176
517.0	265467	1404767	6639975	24.52097	-67.18366
518.0	265444	1410032	6639957	24.50324	-67.13545
519.0	265419	1415311	6639937	24.48546	-67.08714
520.0	265394	1420603	6639917	24.46761	-67.03871

TABLE X (U)

TIME SEC	ALTITUDE M	RANGE M	E.G.DIST. M	LATITUDE DEG	LONGITUDE DEG
521.0	265367	1425909	6639895	24.44970	-66.99017
522.0	265340	1431228	6639872	24.43173	-66.94152
523.0	265311	1436561	6639849	24.41369	-66.89277
524.0	265281	1441908	6639824	24.39559	-66.84390
525.0	265251	1447268	6639799	24.37743	-66.79492
526.0	265220	1452642	6639773	24.35920	-66.74583
527.0	265187	1458030	6639746	24.34091	-66.69663
528.0	265154	1463432	6639718	24.32255	-66.64732
529.0	265120	1468847	6639689	24.30413	-66.59790
530.0	265086	1474277	6639660	24.28564	-66.54836
531.0	265050	1479720	6639630	24.26709	-66.49872
532.0	265014	1485178	6639599	24.24847	-66.44895
533.0	264977	1490650	6639567	24.22979	-66.39908
534.0	264939	1496136	6639535	24.21104	-66.34909
535.0	264901	1501636	6639502	24.19222	-66.29898
536.0	264862	1507150	6639468	24.17334	-66.24877
537.0	264823	1512679	6639434	24.15439	-66.19843
538.0	264783	1518223	6639399	24.13537	-66.14798
539.0	264742	1523780	6639364	24.11628	-66.09742
540.0	264701	1529353	6639328	24.09712	-66.04674
541.0	264659	1534939	6639291	24.07790	-65.99594
542.0	264617	1540541	6639255	24.05861	-65.94502
543.0	264574	1546157	6639217	24.03925	-65.89399
544.0	264531	1551788	6639179	24.01982	-65.84283
545.0	264487	1557434	6639141	24.00031	-65.79156
546.0	264443	1563094	6639103	23.98074	-65.74017
547.0	264399	1568770	6639064	23.96110	-65.68866
548.0	264354	1574461	6639025	23.94139	-65.63704
549.0	264310	1580167	6638986	23.92161	-65.58529
550.0	264265	1585887	6638946	23.90175	-65.53342
551.0	264219	1591623	6638906	23.88182	-65.48143
552.0	264174	1597375	6638867	23.86183	-65.42931
553.0	264128	1603141	6638827	23.84175	-65.37708
554.0	264083	1608923	6638786	23.82161	-65.32472
555.0	264037	1614720	6638746	23.80140	-65.27224
556.0	263991	1620533	6638706	23.78110	-65.21964
557.0	263945	1626362	6638666	23.76074	-65.16691
558.0	263899	1632206	6638625	23.74030	-65.11406
559.0	263853	1638066	6638585	23.71979	-65.06108
560.0	263807	1643941	6638545	23.69920	-65.00798

TABLE X (U)

TIME SEC	ALTITUDE M	RANGE M	E.C.DIST. M	LATITUDE DEG	LONGITUDE DEG
561.0	263762	1649832	6638505	23.67853	-64.95476
562.0	263716	1655740	6638465	23.65780	-64.90140
563.0	263670	1661663	6638425	23.63698	-64.84792
564.0	263625	1667602	6638385	23.61609	-64.79432
565.0	263580	1673558	6638346	23.59512	-64.74058
566.0	263535	1679529	6638307	23.57408	-64.68672
567.0	263490	1685517	6638268	23.55295	-64.63273
568.0	263446	1691521	6638229	23.53175	-64.57861
569.0	263402	1697541	6638191	23.51047	-64.52436
570.0	263358	1703578	6638153	23.48912	-64.46998
571.0	263315	1709632	6638116	23.46768	-64.41547
572.0	263272	1715702	6638079	23.44617	-64.36083
573.0	263229	1721788	6638042	23.42457	-64.30606
574.0	263187	1727892	6638006	23.40290	-64.25115
575.0	263146	1734012	6637971	23.38114	-64.19612
576.0	263105	1740149	6637936	23.35930	-64.14095
577.0	263065	1746303	6637902	23.33739	-64.08564
578.0	263026	1752474	6637868	23.31538	-64.03021
579.0	262987	1758662	6637836	23.29331	-63.97464
580.0	262948	1764867	6637803	23.27114	-63.91893
581.0	262911	1771090	6637772	23.24889	-63.86308
582.0	262874	1777330	6637741	23.22656	-63.80710
583.0	262838	1783587	6637712	23.20415	-63.75099
584.0	262803	1789862	6637683	23.18165	-63.69473
585.0	262769	1796154	6637654	23.15906	-63.63834
586.0	262736	1802464	6637627	23.13640	-63.58181
587.0	262703	1808792	6637601	23.11364	-63.52514
588.0	262671	1815137	6637575	23.09080	-63.46833
589.0	262640	1821501	6637550	23.06788	-63.41139
590.0	262610	1827882	6637527	23.04486	-63.35430
591.0	262581	1834281	6637504	23.02176	-63.29707
592.0	262553	1840699	6637482	22.99857	-63.23970
593.0	262526	1847135	6637461	22.97530	-63.18218
594.0	262500	1853588	6637442	22.95193	-63.12452
595.0	262475	1860061	6637423	22.92848	-63.06672
596.0	262451	1866551	6637406	22.90494	-63.00878
597.0	262429	1873061	6637389	22.88130	-62.95069
598.0	262407	1879589	6637374	22.85758	-62.89245
599.0	262387	1886136	6637360	22.83377	-62.83407
600.0	262367	1892701	6637347	22.80986	-62.77555

TABLE X (U)

TIME SEC	ALTITUDE M	RANGE M	E.C.DIST. M	LATITUDE DEG	LØNGITUDE DEG
601.0	262349	1899285	6637335	22.78587	-62.71687
602.0	262332	1905889	6637324	22.76178	-62.65805
603.0	262316	1912511	6637315	22.73759	-62.59907
604.0	262302	1919153	6637307	22.71332	-62.53995
605.0	262288	1925814	6637300	22.68895	-62.48068
606.0	262276	1932494	6637295	22.66449	-62.42126
607.0	262266	1939194	6637291	22.63993	-62.36169
608.0	262257	1945913	6637288	22.61528	-62.30196
609.0	262249	1952651	6637287	22.59053	-62.24209
610.0	262243	1959410	6637287	22.56569	-62.18206
611.0	262238	1966188	6637289	22.54075	-62.12187
612.0	262234	1972986	6637292	22.51571	-62.06154
613.0	262233	1979804	6637297	22.49058	-62.00105
614.0	262232	1986642	6637304	22.46535	-61.94040
615.0	262234	1993500	6637312	22.44002	-61.87960
616.0	262236	2000378	6637321	22.41459	-61.81864
617.0	262241	2007277	6637333	22.38906	-61.75752
618.0	262247	2014196	6637346	22.36344	-61.69624
619.0	262255	2021136	6637361	22.33771	-61.63481
620.0	262265	2028096	6637377	22.31188	-61.57322
621.0	262277	2035077	6637396	22.28595	-61.51146
622.0	262291	2042079	6637416	22.25992	-61.44955
623.0	262305	2049102	6637438	22.23379	-61.38747
624.0	262322	2056147	6637461	22.20755	-61.32522
625.0	262340	2063212	6637486	22.18120	-61.26282
626.0	262360	2070299	6637514	22.15476	-61.20024
627.0	262383	2077409	6637543	22.12820	-61.13750
628.0	262408	2084540	6637575	22.10153	-61.07458
629.0	262434	2091693	6637609	22.07477	-61.01150

## S-IV CUTOFF SIGNAL

629.970	262462	2098646	6637643	22.04872	-60.95020
630.0	262463	2098861	6637644	22.04791	-60.94830
631.0	262493	2106041	6637681	22.02099	-60.88503
632.0	262524	2113226	6637719	21.99402	-60.82174
633.0	262555	2120412	6637758	21.96702	-60.75847
634.0	262587	2127597	6637796	21.94000	-60.69523
635.0	262619	2134781	6637835	21.91295	-60.63202

TABLE X (U)

TIME SEC	ALTITUDE M	RANGE M	E.C.DIST. M	LATITUDE DEG	LONGITUDE DEG
636.0	262651	2141965	6637875	21.88587	-60.56884
637.0	262684	2149149	6637914	21.85877	-60.50569
638.0	262717	2156333	6637954	21.83164	-60.44256
639.0	262750	2163516	6637995	21.80449	-60.37946
INSERTION					
639.970	262783	2170484	6638034	21.77812	-60.31828

TABLE XI (U)

TIME SEC	EARTH-VEL M/SEC	MACH	DYNPRES N/CM SQ	VEL-ELEV DEG	VEL-AZ DEG	SPACE-VEL M/SEC
<b>FIRST MOTION</b>						
0.310	0.	0.017	0.00213	90.000	0.	408.9
<b>LIFTOFF SIGNAL</b>						
0.410	0.3	0.017	0.00214	87.030	72.690	409.0
1.0	2.3	0.019	0.00252	87.776	63.778	409.0
2.0	5.6	0.024	0.00425	88.536	42.590	409.1
3.0	9.1	0.032	0.00745	88.833	19.112	409.1
4.0	12.6	0.041	0.01225	88.919	2.284	409.1
5.0	16.1	0.051	0.01880	88.966	352.989	409.2
6.0	19.8	0.062	0.02721	89.025	348.160	409.4
7.0	23.6	0.073	0.03762	89.098	345.190	409.5
8.0	27.5	0.084	0.05016	89.173	342.239	409.7
9.0	31.4	0.096	0.06496	89.242	338.005	410.0
10.0	35.5	0.108	0.08215	89.296	331.752	410.3
11.0	39.6	0.121	0.10187	89.330	323.517	410.6
12.0	43.9	0.133	0.12326	89.342	314.142	410.9
13.0	48.2	0.145	0.14660	89.339	304.768	411.3
14.0	52.6	0.158	0.17256	89.336	296.106	411.8
15.0	57.2	0.172	0.20127	89.352	288.089	412.3
16.0	61.8	0.185	0.23284	89.402	279.847	413.0
17.0	66.6	0.199	0.26760	89.499	269.164	413.8
18.0	71.4	0.214	0.30544	89.634	249.278	414.7
19.0	76.3	0.229	0.34636	89.715	201.159	415.9
20.0	81.4	0.244	0.39006	89.528	152.014	417.3
21.0	86.5	0.259	0.43595	89.138	132.704	419.0
22.0	91.7	0.275	0.48478	88.631	124.175	420.9
23.0	96.9	0.291	0.53661	88.030	119.481	423.1
24.0	102.3	0.307	0.59144	87.346	116.537	425.7
25.0	107.7	0.324	0.64891	86.590	114.542	428.5
26.0	113.1	0.338	0.70043	85.772	113.125	431.7
27.0	118.7	0.353	0.75160	84.903	112.089	435.2
28.0	124.3	0.369	0.80808	83.997	111.312	438.9
29.0	130.1	0.385	0.86873	83.082	110.839	443.0
30.0	136.0	0.401	0.92897	82.149	110.455	447.3

TABLE XI (U)

TIME SEC	EARTH-VEL M/SEC	MACH	DYNPRES N/CM SQ	VEL-ELEV DEG	VEL-AZ DEG	SPACE-VEL M/SEC
31.0	142.1	0.418	0.98946	81.203	110.103	451.9
32.0	148.3	0.436	1.05885	80.244	109.754	456.8
33.0	154.6	0.455	1.13242	79.278	109.400	462.0
34.0	161.2	0.475	1.21383	78.288	108.993	467.6
35.0	167.8	0.496	1.29526	77.314	108.604	473.4
36.0	174.6	0.516	1.37623	76.365	108.247	479.4
37.0	181.5	0.538	1.46427	75.444	107.931	485.6
38.0	188.5	0.560	1.55441	74.553	107.656	492.0
39.0	195.8	0.583	1.64563	73.690	107.408	498.6
40.0	203.1	0.606	1.73538	72.859	107.181	505.5
41.0	210.7	0.628	1.82132	72.058	106.973	512.5
42.0	218.4	0.650	1.90434	71.282	106.771	519.7
43.0	226.3	0.675	1.99721	70.540	106.565	527.1
44.0	234.3	0.701	2.10084	69.836	106.363	534.6
45.0	242.4	0.727	2.19468	69.166	106.180	542.2
46.0	250.7	0.753	2.28705	68.524	106.026	550.1
47.0	259.2	0.779	2.37406	67.912	105.904	558.0
48.0	267.8	0.806	2.46494	67.318	105.806	566.2
49.0	276.6	0.836	2.56541	66.735	105.714	574.5
50.0	285.5	0.864	2.65076	66.156	105.615	583.1
51.0	294.5	0.893	2.73772	65.577	105.502	591.9
52.0	303.7	0.923	2.81875	64.997	105.380	601.0
53.0	313.0	0.949	2.87243	64.413	105.267	610.2
54.0	322.3	0.978	2.93880	63.829	105.174	619.5

## MACH ONE

54.693	328.7	1.000	2.99216	63.423	105.119	626.1
55.0	331.6	1.010	3.01528	63.244	105.096	629.0
56.0	340.8	1.042	3.08072	62.649	105.015	638.5
57.0	350.0	1.073	3.13124	62.065	104.929	648.0
58.0	359.3	1.100	3.15627	61.485	104.836	657.7
59.0	368.8	1.131	3.18775	60.908	104.743	667.6
60.0	378.5	1.168	3.25128	60.335	104.662	677.8
61.0	388.5	1.204	3.29669	59.761	104.598	688.3
62.0	398.7	1.244	3.35474	59.186	104.538	699.1
63.0	409.3	1.283	3.39243	58.610	104.459	710.2
64.0	420.2	1.318	3.39875	58.039	104.349	721.7
65.0	431.4	1.365	3.45442	57.485	104.217	733.5

TABLE XI (U)

TIME SEC	EARTH-VEL M/SEC	MACH	DYNPRES N/CM SQ	VEL-ELEV DEG	VEL-AZ DEG	SPACE-VEL M/SEC
66.0	442.9	1.406	3.47004	56.942	104.078	745.7
67.0	454.8	1.455	3.51008	56.418	103.952	758.1
68.0	466.9	1.494	3.49433	55.906	103.852	770.8
69.0	479.4	1.537	3.48366	55.398	103.782	783.8
MAXIMUM DYNAMIC PRESSURE						
69.210	482.0	1.548	3.49054	55.292	103.771	786.6
70.0	492.2	1.592	3.51686	54.895	103.733	797.2
71.0	505.4	1.632	3.47087	54.396	103.700	810.9
72.0	518.9	1.689	3.48428	53.901	103.679	825.0
73.0	532.8	1.743	3.47509	53.407	103.677	839.5
74.0	547.0	1.804	3.47314	52.917	103.660	854.3
75.0	561.6	1.864	3.45649	52.425	103.647	869.6
76.0	576.6	1.935	3.46339	51.923	103.630	885.3
77.0	591.9	1.999	3.43188	51.421	103.627	901.5
78.0	607.7	2.058	3.36598	50.920	103.637	918.0
79.0	623.8	2.142	3.36648	50.423	103.669	934.9
80.0	640.4	2.213	3.31185	49.931	103.711	952.3
81.0	657.3	2.286	3.25183	49.447	103.740	969.9
82.0	674.7	2.355	3.17033	48.969	103.769	988.1
83.0	692.4	2.410	3.04407	48.490	103.784	1006.6
84.0	710.6	2.456	2.89408	48.010	103.804	1025.7
85.0	729.2	2.522	2.79452	47.530	103.831	1045.1
86.0	748.2	2.575	2.66378	47.056	103.867	1065.0
87.0	767.7	2.641	2.56070	46.593	103.906	1085.3
88.0	787.5	2.703	2.44888	46.140	103.941	1106.0
89.0	807.7	2.782	2.36336	45.700	103.968	1127.1
90.0	828.4	2.821	2.21334	45.265	104.006	1148.6
91.0	849.6	2.894	2.11942	44.832	104.046	1170.6
92.0	871.2	2.943	1.99359	44.400	104.084	1193.0
93.0	893.2	3.008	1.89252	43.978	104.119	1215.9
94.0	915.6	3.069	1.79076	43.568	104.144	1239.1
95.0	938.4	3.158	1.71819	43.166	104.166	1262.7
96.0	961.6	3.230	1.62671	42.769	104.187	1286.7
97.0	985.2	3.292	1.52806	42.375	104.212	1311.2
98.0	1009.4	3.345	1.42503	41.984	104.244	1336.2
99.0	1034.1	3.415	1.34202	41.592	104.285	1361.7
100.0	1059.3	3.498	1.27003	41.206	104.322	1387.7

TABLE XI (U)

TIME SEC	EARTH-VEL M/SEC	MACH	DYNPRES N/CM SQ	VEL-ELEV DEG	VEL-AZ DEG	SPACE-VEL M/SEC
101.0	1084.8	3.568	1.18925	40.835	104.348	1414.0
102.0	1110.7	3.663	1.12805	40.475	104.366	1440.6
103.0	1137.0	3.731	1.05687	40.121	104.380	1467.7
104.0	1163.7	3.800	0.98486	39.775	104.388	1495.2
105.0	1190.9	3.870	0.92864	39.433	104.397	1523.2
106.0	1218.7	3.940	0.86307	39.093	104.409	1551.7
107.0	1247.0	4.012	0.78862	38.755	104.428	1580.8
108.0	1275.8	4.084	0.74278	38.420	104.447	1610.4
109.0	1305.0	4.157	0.69032	38.095	104.461	1640.4
110.0	1334.8	4.231	0.63090	37.773	104.479	1670.9
111.0	1365.1	4.307	0.58757	37.455	104.495	1701.9
112.0	1395.9	4.382	0.54095	37.143	104.505	1733.5
113.0	1427.2	4.459	0.50514	36.833	104.512	1765.5
114.0	1459.0	4.537	0.46580	36.526	104.518	1798.1
115.0	1491.4	4.615	0.43022	36.219	104.525	1831.2
116.0	1524.4	4.695	0.40281	35.915	104.535	1864.9
117.0	1558.0	4.776	0.37130	35.612	104.547	1899.2
118.0	1592.1	4.857	0.33587	35.312	104.560	1934.1
119.0	1626.8	4.940	0.31791	35.015	104.573	1969.6
120.0	1662.2	5.025	0.30051	34.719	104.585	2005.7
121.0	1698.2	5.110	0.28047	34.426	104.597	2042.4
122.0	1734.8	5.196	0.25756	34.134	104.611	2079.8
123.0	1772.1	5.283	0.23159	33.844	104.624	2117.8
124.0	1810.1	5.372	0.20379	33.555	104.639	2156.5
125.0	1848.7	5.485	0.18823	33.268	104.654	2195.9
126.0	1888.1	5.602	0.17391	32.982	104.671	2236.0
127.0	1928.2	5.721	0.16041	32.697	104.687	2276.9
128.0	1969.1	5.843	0.14769	32.413	104.703	2318.4
129.0	2010.7	5.992	0.14086	32.130	104.720	2360.8
130.0	2053.2	6.171	0.13121	31.849	104.737	2404.0
131.0	2096.5	6.357	0.12179	31.570	104.754	2448.0
132.0	2140.6	6.550	0.11263	31.297	104.770	2492.9
133.0	2185.6	6.751	0.10377	31.030	104.786	2538.6
134.0	2231.6	6.960	0.09522	30.772	104.802	2585.2
135.0	2278.4	7.177	0.08700	30.524	104.818	2632.7
136.0	2325.9	7.403	0.07911	30.293	104.834	2680.7
137.0	2374.9	7.640	0.07161	30.064	104.852	2730.3
138.0	2424.9	7.888	0.06450	29.850	104.869	2780.9
139.0	2475.8	8.147	0.05776	29.644	104.887	2832.3
140.0	2527.9	8.419	0.05144	29.446	104.905	2884.9

TABLE XI (U)

TIME SEC	EARTH-VEL M/SEC	MACH	DYNPRES N/CM SQ	VEL-ELEV DEG	VEL-AZ DEG	SPACE-VEL M/SEC
IECØ SIGNAL						
140.750	2567.4	8.626	0.04723	29.312	104.920	2924.7
141.0	2580.3	8.700	0.04552	29.261	104.924	2937.8
142.0	2606.0	8.900	0.03921	29.093	104.941	2963.9
143.0	2631.3	9.107	0.03356	28.928	104.958	2989.7
144.0	2656.3	9.320	0.02856	28.770	104.976	3015.2
145.0	2681.3	9.541	0.02416	28.609	104.994	3040.6
146.0	2706.8	9.774	0.02031	28.456	105.012	3066.6
ØECØ SIGNAL						
146.730	2725.7	9.945	0.01796	28.348	105.025	3085.9
147.0	2731.7	10.013	0.01695	28.311	105.029	3091.9
SEPARATION SIGNAL						
147.140	2731.4	10.034	0.01648	28.293	105.031	3091.7
148.0	2729.0	10.161	0.01378	28.163	105.044	3089.7
S-IV IGNITION SIGNAL						
148.840	2726.0	10.286	0.01153	28.033	105.058	3087.2
149.0	2725.4	10.310	0.01114	28.008	105.061	3086.7
150.0	2722.1	10.467	0.00896	27.857	105.077	3083.9
151.0	2721.7	10.549	0.00715	27.711	105.092	3084.0
152.0	2724.0	10.558	0.00556	27.562	105.107	3086.8
153.0	2726.1	10.566	0.00433	27.416	105.123	3089.3
154.0	2728.1	10.574	0.00337	27.273	105.140	3091.8
155.0	2730.5	10.583	0.00263	27.121	105.156	3094.7
156.0	2732.3	10.590	0.00205	26.972	105.172	3097.0
157.0	2734.5	10.598	0.00161	26.828	105.189	3099.6
158.0	2736.7	10.607	0.00126	26.685	105.206	3102.3
159.0	2738.9	10.615	0.00099	26.541	105.223	3105.0
160.0	2741.2	10.560	0.00078	26.397	105.239	3107.7

TABLE XI (U)

TIME SEC	EARTH-VEL M/SEC	MACH	DYNPRES N/CM SQ	VEL-ELEV DEG	VEL-AZ DEG	SPACE-VEL M/SEC
161.0	2743.5	10.424	0.00060	26.253	105.255	3110.5
162.0	2745.9	10.294	0.00047	26.110	105.271	3113.3
163.0	2748.2	10.169	0.00036	25.967	105.287	3116.1
164.0	2750.6	10.050	0.00029	25.825	105.304	3119.0
165.0	2753.1	9.937	0.00023	25.684	105.320	3121.8
166.0	2755.5	9.828	0.00018	25.544	105.337	3124.7
167.0	2758.0	9.723	0.00015	25.403	105.354	3127.6
168.0	2760.5	9.623	0.00012	25.264	105.370	3130.6
169.0	2763.1	9.527	0.00010	25.125	105.387	3133.5
170.0	2765.7	9.434	0.00008	24.986	105.403	3136.5
171.0	2768.3	9.345	0.00006	24.846	105.419	3139.6
172.0	2770.9	9.260	0.00005	24.707	105.435	3142.7
173.0	2773.6	9.048	0.00004	24.569	105.450	3145.8
174.0	2776.3	8.655	0.00003	24.430	105.465	3148.9
175.0	2779.0	8.313	0.00003	24.292	105.480	3152.0
176.0	2781.8	8.010	0.00002	24.154	105.496	3155.2
177.0	2784.6	7.741	0.00002	24.017	105.513	3158.4
178.0	2787.4	7.499	0.00002	23.881	105.531	3161.6
179.0	2790.3	7.281	0.00001	23.746	105.549	3164.8
180.0	2793.1	7.082	0.00001	23.610	105.567	3168.1
181.0	2796.1	6.901	0.00001	23.473	105.585	3171.4
182.0	2799.0	6.734	0.00001	23.336	105.601	3174.8
183.0	2802.0	6.580	0.00001	23.201	105.617	3178.1
184.0	2805.0	6.438	0.00001	23.067	105.632	3181.5
185.0	2808.0	6.306	0.00001	22.934	105.648	3184.9
186.0	2811.0	6.183	0.00001	22.802	105.664	3188.3
187.0	2814.1	6.068	0.00000	22.669	105.680	3191.8
188.0	2817.2	5.960	0.00000	22.536	105.697	3195.3
189.0	2820.4	5.859	0.00000	22.404	105.714	3198.8
190.0	2823.6	5.763	0.00000	22.272	105.731	3202.3
191.0	2826.8	5.673	0.00000	22.141	105.748	3205.9
192.0	2830.0	5.589	0.00000	22.010	105.765	3209.5
193.0	2833.3	5.508	0.00000	21.878	105.781	3213.1
194.0	2836.6	5.432	0.00000	21.747	105.796	3216.7
195.0	2839.9	5.360	0.00000	21.615	105.812	3220.4
196.0	2843.3	5.291	0.00000	21.485	105.828	3224.1
197.0	2846.6	5.225	0.00000	21.354	105.844	3227.9
198.0	2850.1	5.163	0.00000	21.223	105.860	3231.7
199.0	2853.6	5.103	0.00000	21.091	105.876	3235.5
200.0	2857.1	5.047	0.00000	20.960	105.892	3239.3

TABLE XI (U)

TIME SEC	EARTH-VEL M/SEC	MACH	DYNPRES N/CM SQ	VEL-ELEV DEG	VEL-AZ DEG	SPACE-VEL M/SEC
201.0	2860.6	4.992	0.00000	20.829	105.909	3243.2
202.0	2864.1	4.940	0.00000	20.702	105.926	3247.1
203.0	2867.7	4.890	0.00000	20.578	105.943	3250.9
204.0	2871.3	4.842	0.00000	20.452	105.960	3254.8
205.0	2874.9	4.796	0.00000	20.325	105.975	3258.8
206.0	2878.5	4.752	0.00000	20.198	105.990	3262.8
207.0	2882.2	4.710	0.00000	20.070	106.004	3266.8
208.0	2886.0	4.669	0.00000	19.942	106.020	3270.8
209.0	2889.7	4.630	0.00000	19.815	106.037	3274.9
210.0	2893.5	4.592	0.00000	19.690	106.055	3279.0
211.0	2897.3	4.555	0.00000	19.566	106.072	3283.1
212.0	2901.1	4.520	0.00000	19.441	106.089	3287.3
213.0	2905.0	4.486	0.00000	19.317	106.105	3291.4
214.0	2908.9	4.454	0.00000	19.194	106.120	3295.6
215.0	2912.8	4.422	0.00000	19.071	106.134	3299.8
216.0	2916.8	4.391	0.00000	18.946	106.150	3304.1
217.0	2920.8	4.362	0.00000	18.823	106.167	3308.4
218.0	2924.8	4.333	0.00000	18.700	106.185	3312.7
219.0	2928.9	4.306	0.00000	18.578	106.203	3317.2
220.0	2933.1	4.279	0.00000	18.457	106.221	3321.6
221.0	2937.3	4.254	0.00000	18.337	106.239	3326.1
222.0	2941.5	4.229	0.00000	18.217	106.256	3330.6
223.0	2945.7	4.204	0.00000	18.097	106.273	3335.1
224.0	2950.0	4.181	0.00000	17.977	106.290	3339.6
225.0	2954.2	4.158	0.00000	17.857	106.307	3344.1
226.0	2958.5	4.136	0.00000	17.737	106.323	3348.6
227.0	2962.8	4.115	0.00000	17.618	106.340	3353.2
228.0	2967.1	4.094	0.00000	17.499	106.357	3357.8
229.0	2971.5	4.074	0.00000	17.380	106.373	3362.4
230.0	2975.9	4.066	0.00000	17.262	106.390	3367.1
231.0	2980.3	4.059	0.00000	17.145	106.407	3371.8
232.0	2984.7	4.052	0.00000	17.028	106.424	3376.4
233.0	2989.2	4.046	0.00000	16.911	106.441	3381.2
234.0	2993.7	4.040	0.00000	16.795	106.458	3385.9
235.0	2998.2	4.034	0.00000	16.679	106.474	3390.7
236.0	3002.8	4.029	0.00000	16.564	106.491	3395.6
237.0	3007.4	4.023	0.00000	16.449	106.508	3400.4
238.0	3012.1	4.018	0.00000	16.334	106.525	3405.3
239.0	3016.8	4.012	0.00000	16.220	106.542	3410.3
240.0	3021.5	4.007	0.00000	16.106	106.559	3415.2

TABLE XI (U)

TIME SEC	EARTH-VEL M/SEC	MACH	DYNPRES N/CM SQ	VEL-ELEV DEG	VEL-AZ DEG	SPACE-VEL M/SEC
241.0	3026.2	4.003	0.00000	15.993	106.576	3420.2
242.0	3031.0	4.001	0.00000	15.880	106.593	3425.2
243.0	3035.8	4.002	0.00000	15.768	106.610	3430.2
244.0	3040.6	4.003	0.00000	15.656	106.627	3435.3
245.0	3045.4	4.004	0.00000	15.544	106.644	3440.3
246.0	3050.3	4.005	0.00000	15.432	106.661	3445.4
247.0	3055.2	4.006	0.00000	15.321	106.678	3450.6
248.0	3060.1	4.007	0.00000	15.210	106.695	3455.7
249.0	3065.1	4.009	0.00000	15.099	106.712	3460.9
250.0	3070.0	4.010	0.00000	14.989	106.729	3466.1
251.0	3075.1	4.011	0.00000	14.880	106.746	3471.3
252.0	3080.1	4.013	0.00000	14.771	106.763	3476.5
253.0	3085.2	4.014	0.00000	14.663	106.780	3481.8
254.0	3090.3	4.016	0.00000	14.554	106.797	3487.1
255.0	3095.4	4.018	0.00000	14.446	106.814	3492.5
256.0	3100.6	4.020	0.00000	14.338	106.832	3497.8
257.0	3105.7	4.021	0.00000	14.231	106.849	3503.2
258.0	3110.9	4.023	0.00000	14.124	106.866	3508.6
259.0	3116.1	4.025	0.00000	14.018	106.883	3514.0
260.0	3121.3	4.027	0.00000	13.912	106.900	3519.4
261.0	3126.6	4.029	0.00000	13.806	106.917	3524.9
262.0	3131.9	4.031	0.00000	13.701	106.934	3530.4
263.0	3137.3	4.034	0.00000	13.596	106.952	3535.9
264.0	3142.7	4.036	0.00000	13.492	106.969	3541.5
265.0	3148.0	4.038	0.00000	13.388	106.986	3547.1
266.0	3153.5	4.041	0.00000	13.285	107.004	3552.7
267.0	3158.9	4.043	0.00000	13.182	107.021	3558.3
268.0	3164.4	4.046	0.00000	13.080	107.038	3564.0
269.0	3169.9	4.048	0.00000	12.977	107.055	3569.7
270.0	3175.5	4.051	0.00000	12.875	107.073	3575.4
271.0	3181.1	4.054	0.00000	12.774	107.090	3581.2
272.0	3186.7	4.057	0.00000	12.673	107.107	3587.0
273.0	3192.3	4.059	0.00000	12.572	107.125	3592.8
274.0	3198.0	4.062	0.00000	12.472	107.142	3598.7
275.0	3203.7	4.065	0.00000	12.372	107.159	3604.5
276.0	3209.5	4.068	0.00000	12.273	107.177	3610.4
277.0	3215.2	4.072	0.00000	12.174	107.194	3616.3
278.0	3221.0	4.075	0.00000	12.076	107.212	3622.3
279.0	3226.7	4.078	0.00000	11.978	107.229	3628.2
280.0	3232.5	4.081	0.00000	11.881	107.247	3634.1

TABLE XI (U)<sup>1</sup>

TIME SEC	EARTH-VEL M/SEC	MACH	DYNPRES N/CM SQ	VEL-ELEV DEG	VEL-AZ DEG	SPACE-VEL M/SEC
281.0	3238.3	4.084	0.00000	11.784	107.264	3640.1
282.0	3244.1	4.088	0.00000	11.688	107.281	3646.0
283.0	3249.9	4.091	0.00000	11.591	107.299	3652.0
284.0	3255.7	4.094	0.00000	11.495	107.316	3658.0
285.0	3261.6	4.098	0.00000	11.400	107.334	3664.0
286.0	3267.6	4.103	0.00000	11.305	107.351	3670.1
287.0	3273.6	4.108	0.00000	11.211	107.369	3676.3
288.0	3279.7	4.113	0.00000	11.117	107.386	3682.5
289.0	3285.7	4.118	0.00000	11.023	107.404	3688.7
290.0	3291.9	4.123	0.00000	10.930	107.422	3695.0
291.0	3298.0	4.128	0.00000	10.837	107.439	3701.3
292.0	3304.2	4.133	0.00000	10.745	107.457	3707.6
293.0	3310.4	4.138	0.00000	10.652	107.474	3713.9
294.0	3316.6	4.143	0.00000	10.561	107.492	3720.3
295.0	3322.9	4.148	0.00000	10.470	107.510	3726.7
296.0	3329.2	4.154	0.00000	10.379	107.527	3733.1
297.0	3335.4	4.159	0.00000	10.290	107.545	3739.5
298.0	3341.7	4.164	0.00000	10.200	107.563	3745.9
299.0	3348.1	4.170	0.00000	10.111	107.581	3752.4
300.0	3354.5	4.175	0.00000	10.022	107.598	3758.9
301.0	3360.9	4.181	0.00000	9.934	107.616	3765.5
302.0	3367.4	4.186	0.00000	9.846	107.634	3772.1
303.0	3373.8	4.192	0.00000	9.758	107.651	3778.7
304.0	3380.3	4.198	0.00000	9.671	107.669	3785.3
305.0	3386.9	4.203	0.00000	9.585	107.687	3791.9
306.0	3393.4	4.209	0.00000	9.498	107.704	3798.6
307.0	3400.1	4.215	0.00000	9.412	107.722	3805.4
308.0	3406.7	4.221	0.00000	9.326	107.740	3812.1
309.0	3413.3	4.227	0.00000	9.241	107.758	3818.9
310.0	3420.0	4.233	0.00000	9.156	107.776	3825.7
311.0	3426.7	4.239	0.00000	9.072	107.795	3832.4
312.0	3433.4	4.245	0.00000	8.989	107.813	3839.3
313.0	3440.2	4.251	0.00000	8.905	107.831	3846.1
314.0	3447.0	4.257	0.00000	8.822	107.848	3853.0
315.0	3453.8	4.263	0.00000	8.740	107.865	3859.9
316.0	3460.6	4.269	0.00000	8.658	107.884	3866.9
317.0	3467.5	4.276	0.00000	8.576	107.902	3873.8
318.0	3474.3	4.282	0.00000	8.495	107.920	3880.8
319.0	3481.2	4.288	0.00000	8.414	107.938	3887.8
320.0	3488.2	4.295	0.00000	8.333	107.956	3894.9

TABLE XI (U)

TIME SEC	EARTH-VEL M/SEC	MACH	DYNPRES N/CM SQ	VEL-ELEV DEG	VEL-AZ DEG	SPACE-VEL M/SEC
321.0	3495.2	4.301	0.00000	8.253	107.974	3902.0
322.0	3502.2	4.308	0.00000	8.173	107.992	3909.1
323.0	3509.3	4.314	0.00000	8.094	108.010	3916.3
324.0	3516.4	4.321	0.00000	8.015	108.028	3923.4
325.0	3523.5	4.327	0.00000	7.936	108.046	3930.6
326.0	3530.6	4.334	0.00000	7.858	108.064	3937.9
327.0	3537.8	4.341	0.00000	7.780	108.082	3945.1
328.0	3545.0	4.348	0.00000	7.704	108.101	3952.4
329.0	3552.3	4.355	0.00000	7.627	108.119	3959.8
330.0	3559.5	4.362	0.00000	7.551	108.137	3967.1
331.0	3566.8	4.368	0.00000	7.475	108.155	3974.5
332.0	3574.1	4.375	0.00000	7.399	108.173	3981.9
333.0	3581.5	4.383	0.00000	7.324	108.192	3989.3
334.0	3588.9	4.390	0.00000	7.249	108.210	3996.8
335.0	3596.3	4.397	0.00000	7.175	108.228	4004.3
336.0	3603.8	4.404	0.00000	7.102	108.247	4011.9
337.0	3611.3	4.411	0.00000	7.029	108.265	4019.4
338.0	3618.8	4.419	0.00000	6.956	108.283	4027.0
339.0	3626.3	4.426	0.00000	6.883	108.302	4034.6
340.0	3633.8	4.433	0.00000	6.811	108.320	4042.2
341.0	3641.3	4.441	0.00000	6.739	108.338	4049.8
342.0	3648.9	4.448	0.00000	6.668	108.357	4057.4
343.0	3656.5	4.455	0.00000	6.598	108.375	4065.1
344.0	3664.2	4.463	0.00000	6.527	108.393	4072.8
345.0	3671.9	4.471	0.00000	6.457	108.412	4080.6
346.0	3679.6	4.478	0.00000	6.387	108.430	4088.4
347.0	3687.4	4.486	0.00000	6.318	108.449	4096.2
348.0	3695.1	4.494	0.00000	6.249	108.467	4104.1
349.0	3702.9	4.501	0.00000	6.180	108.486	4111.9
350.0	3710.8	4.509	0.00000	6.112	108.504	4119.8
351.0	3718.6	4.517	0.00000	6.045	108.523	4127.8
352.0	3726.5	4.525	0.00000	5.978	108.541	4135.7
353.0	3734.5	4.533	0.00000	5.911	108.560	4143.7
354.0	3742.4	4.541	0.00000	5.844	108.579	4151.7
355.0	3750.4	4.549	0.00000	5.778	108.597	4159.8
356.0	3758.4	4.557	0.00000	5.712	108.616	4167.8
357.0	3766.4	4.565	0.00000	5.646	108.634	4175.9
358.0	3774.5	4.573	0.00000	5.582	108.653	4184.0
359.0	3782.6	4.582	0.00000	5.517	108.672	4192.2
360.0	3790.8	4.590	0.00000	5.454	108.691	4200.4

TABLE XI (U)

TIME SEC	EARTH-VEL M/SEC	MACH	DYNPRES N/CM SQ	VEL-ELEV DEG	VEL-AZ DEG	SPACE-VEL M/SEC
361.0	3799.0	4.598	0.00000	5.391	108.709	4208.7
362.0	3807.2	4.607	0.00000	5.328	108.728	4216.9
363.0	3815.4	4.615	0.00000	5.265	108.747	4225.2
364.0	3823.7	4.624	0.00000	5.203	108.766	4233.5
365.0	3832.0	4.632	0.00000	5.141	108.784	4241.9
366.0	3840.3	4.641	0.00000	5.079	108.803	4250.2
367.0	3848.6	4.649	0.00000	5.018	108.822	4258.6
368.0	3857.0	4.658	0.00000	4.958	108.841	4267.0
369.0	3865.3	4.666	0.00000	4.898	108.860	4275.4
370.0	3873.8	4.675	0.00000	4.838	108.879	4283.9
371.0	3882.2	4.684	0.00000	4.778	108.898	4292.4
372.0	3890.7	4.693	0.00000	4.718	108.917	4300.9
373.0	3899.2	4.702	0.00000	4.659	108.936	4309.5
374.0	3907.7	4.711	0.00000	4.600	108.955	4318.0
375.0	3916.3	4.719	0.00000	4.542	108.974	4326.6
376.0	3924.9	4.728	0.00000	4.484	108.993	4335.3
377.0	3933.5	4.737	0.00000	4.427	109.012	4343.9
378.0	3942.1	4.747	0.00000	4.370	109.031	4352.6
379.0	3950.8	4.756	0.00000	4.313	109.049	4361.3
380.0	3959.5	4.765	0.00000	4.256	109.068	4370.0
381.0	3968.2	4.774	0.00000	4.200	109.087	4378.8
382.0	3977.0	4.783	0.00000	4.144	109.106	4387.6
383.0	3985.8	4.793	0.00000	4.089	109.125	4396.4
384.0	3994.6	4.802	0.00000	4.034	109.145	4405.3
385.0	4003.4	4.811	0.00000	3.979	109.164	4414.1
386.0	4012.3	4.821	0.00000	3.925	109.184	4423.0
387.0	4021.2	4.830	0.00000	3.871	109.203	4432.0
388.0	4030.1	4.840	0.00000	3.817	109.223	4441.0
389.0	4039.1	4.849	0.00000	3.764	109.242	4450.0
390.0	4048.2	4.859	0.00000	3.711	109.262	4459.0
391.0	4057.2	4.869	0.00000	3.658	109.281	4468.1
392.0	4066.3	4.878	0.00000	3.606	109.300	4477.2
393.0	4075.4	4.888	0.00000	3.554	109.320	4486.3
394.0	4084.5	4.898	0.00000	3.503	109.339	4495.5
395.0	4093.7	4.908	0.00000	3.452	109.359	4504.7
396.0	4102.9	4.918	0.00000	3.402	109.378	4514.0
397.0	4112.2	4.928	0.00000	3.352	109.397	4523.2
398.0	4121.5	4.938	0.00000	3.302	109.416	4532.6
399.0	4130.8	4.948	0.00000	3.253	109.436	4541.9
400.0	4140.1	4.958	0.00000	3.204	109.455	4551.2

TABLE XI (U)

TIME SEC	EARTH-VEL M/SEC	MACH	DYNPRES N/CM SQ	VEL-ELEV DEG	VEL-AZ DEG	SPACE-VEL M/SEC.
401.0	4149.4	4.968	0.00000	3.155	109.475	4560.6
402.0	4158.8	4.978	0.00000	3.107	109.494	4570.0
403.0	4168.2	4.989	0.00000	3.058	109.514	4579.4
404.0	4177.6	4.999	0.00000	3.011	109.533	4588.9
405.0	4187.1	5.009	0.00000	2.963	109.552	4598.4
406.0	4196.6	5.020	0.00000	2.917	109.572	4607.9
407.0	4206.2	5.030	0.00000	2.871	109.591	4617.5
408.0	4215.7	5.041	0.00000	2.825	109.611	4627.0
409.0	4225.3	5.051	0.00000	2.779	109.631	4636.6
410.0	4234.9	5.062	0.00000	2.734	109.650	4646.3
411.0	4244.5	5.072	0.00000	2.689	109.670	4655.9
412.0	4254.2	5.083	0.00000	2.644	109.689	4665.7
413.0	4264.0	5.094	0.00000	2.600	109.709	4675.4
414.0	4273.8	5.104	0.00000	2.556	109.729	4685.2
415.0	4283.6	5.115	0.00000	2.513	109.749	4695.1
416.0	4293.4	5.126	0.00000	2.469	109.768	4704.9
417.0	4303.3	5.137	0.00000	2.426	109.788	4714.8
418.0	4313.2	5.148	0.00000	2.383	109.808	4724.8
419.0	4323.2	5.159	0.00000	2.341	109.828	4734.7
420.0	4333.2	5.170	0.00000	2.299	109.848	4744.7
421.0	4343.2	5.181	0.00000	2.258	109.868	4754.8
422.0	4353.2	5.193	0.00000	2.217	109.888	4764.8
423.0	4363.3	5.204	0.00000	2.177	109.908	4774.9
424.0	4373.5	5.215	0.00000	2.136	109.928	4785.1
425.0	4383.7	5.227	0.00000	2.096	109.948	4795.3
426.0	4393.9	5.238	0.00000	2.057	109.968	4805.5
427.0	4404.1	5.249	0.00000	2.018	109.988	4815.8
428.0	4414.4	5.261	0.00000	1.979	110.008	4826.0
429.0	4424.6	5.272	0.00000	1.940	110.028	4836.3
430.0	4434.9	5.284	0.00000	1.902	110.048	4846.6
431.0	4445.3	5.296	0.00000	1.864	110.068	4857.0
432.0	4455.7	5.307	0.00000	1.826	110.088	4867.4
433.0	4466.1	5.319	0.00000	1.789	110.108	4877.8
434.0	4476.5	5.331	0.00000	1.752	110.129	4888.2
435.0	4487.0	5.343	0.00000	1.716	110.149	4898.7
436.0	4497.5	5.355	0.00000	1.680	110.169	4909.2
437.0	4508.0	5.366	0.00000	1.644	110.189	4919.7
438.0	4518.6	5.378	0.00000	1.608	110.209	4930.3
439.0	4529.1	5.390	0.00000	1.573	110.230	4940.9
440.0	4539.7	5.402	0.00000	1.538	110.250	4951.5

TABLE XI (U)

TIME SEC	EARTH-VEL M/SEC	MACH	DYNPRES N/CM SQ	VEL-ELEV DEG	VEL-AZ DEG	SPACE-VEL M/SEC
441.0	4550.4	5.415	0.00000	1.503	110.270	4962.2
442.0	4561.2	5.427	0.00000	1.469	110.291	4972.9
443.0	4572.0	5.439	0.00000	1.436	110.311	4983.7
444.0	4582.8	5.451	0.00000	1.402	110.331	4994.6
445.0	4593.6	5.464	0.00000	1.369	110.352	5005.4
446.0	4604.5	5.476	0.00000	1.336	110.372	5016.3
447.0	4615.4	5.489	0.00000	1.304	110.392	5027.2
448.0	4626.4	5.501	0.00000	1.272	110.413	5038.2
449.0	4637.4	5.514	0.00000	1.240	110.433	5049.2
450.0	4648.4	5.526	0.00000	1.208	110.454	5060.2
451.0	4659.5	5.539	0.00000	1.177	110.475	5071.3
452.0	4670.6	5.552	0.00000	1.147	110.495	5082.4
453.0	4681.7	5.565	0.00000	1.116	110.515	5093.6
454.0	4692.9	5.577	0.00000	1.086	110.536	5104.7
455.0	4704.1	5.590	0.00000	1.056	110.557	5115.9
456.0	4715.4	5.603	0.00000	1.026	110.577	5127.2
457.0	4726.6	5.616	0.00000	0.997	110.598	5138.4
458.0	4737.9	5.629	0.00000	0.968	110.619	5149.8
459.0	4749.3	5.642	0.00000	0.939	110.639	5161.1
460.0	4760.7	5.656	0.00000	0.910	110.660	5172.5
461.0	4772.1	5.669	0.00000	0.883	110.681	5183.9
462.0	4783.6	5.682	0.00000	0.855	110.702	5195.4
463.0	4795.1	5.695	0.00000	0.828	110.722	5206.9
464.0	4806.6	5.709	0.00000	0.801	110.743	5218.4
465.0	4818.1	5.722	0.00000	0.774	110.764	5229.9
466.0	4829.6	5.735	0.00000	0.748	110.785	5241.5
467.0	4841.3	5.749	0.00000	0.722	110.806	5253.1
468.0	4853.0	5.763	0.00000	0.697	110.826	5264.8
469.0	4864.7	5.776	0.00000	0.672	110.847	5276.5
470.0	4876.5	5.790	0.00000	0.647	110.868	5288.3
471.0	4888.3	5.804	0.00000	0.622	110.889	5300.1
472.0	4900.1	5.817	0.00000	0.597	110.910	5311.9
473.0	4912.0	5.831	0.00000	0.573	110.931	5323.8
474.0	4923.9	5.845	0.00000	0.549	110.952	5335.7
475.0	4935.9	5.859	0.00000	0.526	110.973	5347.7
476.0	4947.9	5.873	0.00000	0.503	110.994	5359.7
477.0	4959.9	5.887	0.00000	0.480	111.016	5371.7
478.0	4972.0	5.901	0.00000	0.457	111.037	5383.8
479.0	4984.1	5.916	0.00000	0.435	111.058	5395.9
480.0	4996.2	5.930	0.00000	0.413	111.079	5408.0

TABLE XI (U)

TIME SEC	EARTH-VEL M/SEC	MACH	DYNPRES N/CM SQ	VEL-ELEV DEG	VEL-AZ DEG	SPACE-VEL M/SEC
481.0	5008.4	5.944	0.00000	0.391	111.100	5420.2
482.0	5020.7	5.959	0.00000	0.370	111.121	5432.5
483.0	5033.0	5.973	0.00000	0.349	111.143	5444.8
484.0	5045.3	5.988	0.00000	0.328	111.164	5457.1
485.0	5057.7	6.002	0.00000	0.308	111.185	5469.5
486.0	5070.1	6.017	0.00000	0.288	111.206	5481.9
487.0	5082.6	6.031	0.00000	0.268	111.228	5494.4
488.0	5095.1	6.046	0.00000	0.248	111.249	5506.9
489.0	5107.6	6.061	0.00000	0.229	111.270	5519.4
490.0	5120.3	6.076	0.00000	0.209	111.292	5532.0
491.0	5132.9	6.091	0.00000	0.190	111.313	5544.6
492.0	5145.6	6.106	0.00000	0.172	111.335	5557.3
493.0	5158.3	6.121	0.00000	0.154	111.357	5570.0
494.0	5171.1	6.136	0.00000	0.136	111.378	5582.8
495.0	5183.9	6.151	0.00000	0.119	111.400	5595.6
496.0	5196.8	6.166	0.00000	0.102	111.421	5608.5
497.0	5209.7	6.182	0.00000	0.085	111.443	5621.4
498.0	5222.6	6.197	0.00000	0.068	111.464	5634.3
499.0	5235.7	6.212	0.00000	0.052	111.486	5647.4
500.0	5248.7	6.228	0.00000	0.035	111.507	5660.4
501.0	5261.8	6.243	0.00000	0.020	111.529	5673.5
502.0	5275.0	6.259	0.00000	0.005	111.550	5686.7
503.0	5288.2	6.275	0.00000	-0.010	111.572	5699.8
504.0	5301.4	6.291	0.00000	-0.025	111.594	5713.1
505.0	5314.7	6.306	0.00000	-0.039	111.615	5726.3
506.0	5328.0	6.322	0.00000	-0.053	111.637	5739.7
507.0	5341.4	6.338	0.00000	-0.067	111.659	5753.0
508.0	5354.8	6.354	0.00000	-0.081	111.681	5766.4
509.0	5368.2	6.370	0.00000	-0.094	111.702	5779.9
510.0	5381.8	6.386	0.00000	-0.107	111.724	5793.4
511.0	5395.3	6.402	0.00000	-0.119	111.746	5806.9
512.0	5408.9	6.419	0.00000	-0.131	111.768	5820.5
513.0	5422.6	6.435	0.00000	-0.143	111.790	5834.2
514.0	5436.4	6.451	0.00000	-0.155	111.812	5847.9
515.0	5450.1	6.468	0.00000	-0.166	111.834	5861.7
516.0	5464.0	6.484	0.00000	-0.177	111.856	5875.5
517.0	5477.8	6.501	0.00000	-0.188	111.878	5889.4
518.0	5491.8	6.518	0.00000	-0.198	111.899	5903.3
519.0	5505.7	6.534	0.00000	-0.208	111.922	5917.3
520.0	5519.8	6.551	0.00000	-0.218	111.944	5931.3

TABLE XI (U)

TIME SEC	EARTH-VEL M/SEC	MACH	DYNPRES N/CM SQ	VEL-ELEV DEG	VEL-AZ DEG	SPACE-VEL M/SEC
521.0	5533.9	6.568	0.00000	-0.228	111.966	5945.4
522.0	5548.1	6.585	0.00000	-0.238	111.988	5959.6
523.0	5562.3	6.602	0.00000	-0.247	112.010	5973.8
524.0	5576.5	6.619	0.00000	-0.256	112.032	5988.0
525.0	5590.8	6.636	0.00000	-0.264	112.054	6002.3
526.0	5605.1	6.654	0.00000	-0.272	112.076	6016.6
527.0	5619.4	6.671	0.00000	-0.280	112.098	6030.9
528.0	5633.8	6.688	0.00000	-0.288	112.121	6045.3
529.0	5648.3	6.706	0.00000	-0.295	112.143	6059.8
530.0	5662.9	6.723	0.00000	-0.302	112.165	6074.3
531.0	5677.5	6.741	0.00000	-0.309	112.187	6089.0
532.0	5692.2	6.758	0.00000	-0.315	112.209	6103.6
533.0	5706.9	6.776	0.00000	-0.321	112.232	6118.4
534.0	5721.7	6.794	0.00000	-0.327	112.254	6133.1
535.0	5736.5	6.812	0.00000	-0.333	112.277	6147.9
536.0	5751.4	6.829	0.00000	-0.338	112.299	6162.8
537.0	5766.3	6.847	0.00000	-0.343	112.322	6177.7
538.0	5781.3	6.866	0.00000	-0.348	112.344	6192.7
539.0	5796.4	6.884	0.00000	-0.352	112.367	6207.8
540.0	5811.5	6.902	0.00000	-0.356	112.389	6222.9
541.0	5826.7	6.920	0.00000	-0.360	112.412	6238.1
542.0	5842.0	6.939	0.00000	-0.364	112.434	6253.4
543.0	5857.3	6.957	0.00000	-0.367	112.457	6268.7
544.0	5872.7	6.976	0.00000	-0.371	112.479	6284.0
545.0	5888.1	6.994	0.00000	-0.373	112.502	6299.5
546.0	5903.6	7.013	0.00000	-0.375	112.525	6314.9
547.0	5919.2	7.032	0.00000	-0.377	112.547	6330.5
548.0	5934.8	7.050	0.00000	-0.378	112.570	6346.1
549.0	5950.4	7.069	0.00000	-0.379	112.593	6361.7
550.0	5966.2	7.088	0.00000	-0.380	112.616	6377.5
551.0	5982.0	7.107	0.00000	-0.381	112.639	6393.3
552.0	5997.9	7.127	0.00000	-0.381	112.661	6409.2
553.0	6013.9	7.146	0.00000	-0.382	112.684	6425.1
554.0	6029.9	7.165	0.00000	-0.382	112.707	6441.1
555.0	6045.9	7.185	0.00000	-0.382	112.730	6457.2
556.0	6062.1	7.204	0.00000	-0.381	112.753	6473.3
557.0	6078.3	7.224	0.00000	-0.380	112.776	6489.5
558.0	6094.5	7.243	0.00000	-0.379	112.799	6505.7
559.0	6110.8	7.263	0.00000	-0.377	112.822	6522.0
560.0	6127.2	7.283	0.00000	-0.376	112.845	6538.4

TABLE XI (U)

TIME SEC	EARTH-VEL M/SEC	MACH	DYNPRES N/CM SQ	VEL-ELEV DEG	VEL-AZ DEG	SPACE-VEL M/SEC
561.0	6143.7	7.303	0.00000	-0.373	112.868	6554.9
562.0	6160.3	7.323	0.00000	-0.371	112.891	6571.5
563.0	6176.9	7.343	0.00000	-0.368	112.915	6588.1
564.0	6193.6	7.363	0.00000	-0.365	112.938	6604.7
565.0	6210.3	7.383	0.00000	-0.362	112.961	6621.5
566.0	6227.2	7.403	0.00000	-0.359	112.984	6638.3
567.0	6244.0	7.424	0.00000	-0.355	113.007	6655.2
568.0	6261.0	7.444	0.00000	-0.351	113.030	6672.1
569.0	6278.1	7.465	0.00000	-0.347	113.054	6689.2
570.0	6295.2	7.485	0.00000	-0.343	113.077	6706.3
571.0	6312.4	7.506	0.00000	-0.338	113.100	6723.5
572.0	6329.6	7.527	0.00000	-0.333	113.124	6740.7
573.0	6347.0	7.548	0.00000	-0.328	113.147	6758.1
574.0	6364.4	7.569	0.00000	-0.322	113.170	6775.5
575.0	6381.9	7.590	0.00000	-0.315	113.194	6793.0
576.0	6399.4	7.611	0.00000	-0.309	113.217	6810.5
577.0	6417.1	7.632	0.00000	-0.302	113.241	6828.2
578.0	6434.8	7.654	0.00000	-0.295	113.264	6845.9
579.0	6452.6	7.675	0.00000	-0.289	113.288	6863.7
580.0	6470.5	7.697	0.00000	-0.282	113.311	6881.6
581.0	6488.5	7.719	0.00000	-0.274	113.335	6899.5
582.0	6506.6	7.740	0.00000	-0.266	113.359	6917.6
583.0	6524.7	7.762	0.00000	-0.259	113.383	6935.7
584.0	6542.9	7.784	0.00000	-0.250	113.406	6953.9
585.0	6561.2	7.806	0.00000	-0.242	113.430	6972.2
586.0	6579.5	7.828	0.00000	-0.234	113.454	6990.5
587.0	6597.9	7.850	0.00000	-0.226	113.478	7008.9
588.0	6616.5	7.872	0.00000	-0.217	113.502	7027.5
589.0	6635.1	7.895	0.00000	-0.209	113.526	7046.1
590.0	6653.8	7.917	0.00000	-0.200	113.550	7064.8
591.0	6672.6	7.940	0.00000	-0.191	113.574	7083.6
592.0	6691.5	7.963	0.00000	-0.182	113.598	7102.5
593.0	6710.5	7.985	0.00000	-0.173	113.621	7121.4
594.0	6729.5	8.008	0.00000	-0.163	113.645	7140.4
595.0	6748.6	8.031	0.00000	-0.153	113.669	7159.5
596.0	6767.8	8.054	0.00000	-0.144	113.693	7178.7
597.0	6787.1	8.077	0.00000	-0.133	113.717	7198.1
598.0	6806.6	8.101	0.00000	-0.124	113.741	7217.5
599.0	6826.1	8.124	0.00000	-0.113	113.765	7237.0
600.0	6845.7	8.148	0.00000	-0.103	113.789	7256.6

TABLE XI (U)

TIME SEC	EARTH-VEL M/SEC	MACH	DYNPRES N/CM SQ	VEL-ELEV DEG	VEL-AZ DEG	SPACE-VEL M/SEC
601.0	6865.5	8.171	0.00000	-0.093	113.813	7276.4
602.0	6885.3	8.195	0.00000	-0.083	113.838	7296.2
603.0	6905.2	8.219	0.00000	-0.072	113.862	7316.1
604.0	6925.2	8.243	0.00000	-0.061	113.886	7336.0
605.0	6945.2	8.267	0.00000	-0.050	113.910	7356.1
606.0	6965.3	8.291	0.00000	-0.039	113.934	7376.2
607.0	6985.6	8.315	0.00000	-0.028	113.958	7396.4
608.0	7005.9	8.339	0.00000	-0.016	113.982	7416.8
609.0	7026.4	8.363	0.00000	-0.004	114.006	7437.2
610.0	7046.9	8.388	0.00000	0.008	114.030	7457.7
611.0	7067.5	8.412	0.00000	0.021	114.054	7478.3
612.0	7088.2	8.437	0.00000	0.033	114.078	7499.0
613.0	7109.0	8.462	0.00000	0.045	114.103	7519.8
614.0	7129.9	8.487	0.00000	0.058	114.127	7540.7
615.0	7151.0	8.512	0.00000	0.071	114.151	7561.8
616.0	7172.1	8.537	0.00000	0.084	114.175	7582.9
617.0	7193.5	8.562	0.00000	0.095	114.200	7604.3
618.0	7214.7	8.588	0.00000	0.112	114.224	7625.5
619.0	7236.0	8.613	0.00000	0.126	114.248	7646.8
620.0	7257.7	8.639	0.00000	0.140	114.272	7668.4
621.0	7279.4	8.664	0.00000	0.152	114.297	7690.2
622.0	7301.3	8.690	0.00000	0.164	114.321	7712.1
623.0	7323.2	8.716	0.00000	0.179	114.345	7734.0
624.0	7345.3	8.742	0.00000	0.194	114.370	7756.1
625.0	7367.5	8.769	0.00000	0.207	114.394	7778.2
626.0	7389.8	8.795	0.00000	0.222	114.419	7800.6
627.0	7412.2	8.822	0.00000	0.237	114.443	7823.0
628.0	7434.8	8.848	0.00000	0.252	114.468	7845.5
629.0	7457.3	8.875	0.00000	0.266	114.492	7868.1

## S-IV CUTOFF SIGNAL

629.970	7478.6	8.900	0.00000	0.281	114.515	7889.4
630.0	7479.3	8.901	0.00000	0.281	114.516	7890.0
631.0	7480.3	8.902	0.00000	0.290	114.543	7891.0
632.0	7480.2	8.901	0.00000	0.293	114.570	7891.0
633.0	7480.2	8.901	0.00000	0.296	114.597	7891.0
634.0	7480.2	8.901	0.00000	0.297	114.624	7891.0
635.0	7480.1	8.901	0.00000	0.300	114.650	7890.9

TABLE XI (U)

TIME SEC	EARTH-VEL M/SEC	MACH	DYNPRES N/CM SQ	VEL-ELEV DEG	VEL-AZ DEG	SPACE-VEL M/SEC
636.0	7480.1	8.900	0.00000	0.302	114.677	7890.8
637.0	7480.0	8.900	0.00000	0.305	114.704	7890.8
638.0	7480.0	8.900	0.00000	0.307	114.730	7890.7
639.0	7479.9	8.899	0.00000	0.310	114.757	7890.7
<b>INSERTION</b>						
<b>639.970</b>	<b>7479.9</b>	<b>8.899</b>	<b>0.00000</b>	<b>0.313</b>	<b>114.783</b>	<b>7890.6</b>

(U) APPENDIX

The origin of the Earth-Fixed Cartesian Coordinate System employed for calculations of this trajectory is the projection of the center of gravity of the complete vehicle at first motion on the Clarke Ellipsoid of 1866.

The X-Z plane is tangent to the reference ellipsoid at the origin of the coordinate system. The positive X-axis is oriented in the flight azimuth direction,  $105^{\circ}$  E of N. The Y-axis is normal to the X-Z plane and is positive above the origin. The Z-axis is normal to the X-Y plane and is in a right handed relation to the X-, Y-axis with the positive direction  $195^{\circ}$  E of N. The origin of this earth-fixed system rotates with an angular velocity identical to that of the earth. The earth-fixed coordinate system is shown in Figure 22.

The Space-Fixed Coordinate System is parallel to the earth-fixed system described above at the instant of launch; however, the origin of this system, which is at the initial center of gravity of the vehicle, and its orientation remains fixed in space.

Altitude, range, earth-centered distance, latitude, longitude, and azimuth, elevation and magnitude of earth-fixed velocity vector are given for the Geographic Coordinate System. The subvehicle point is defined as the intersection of the radius vector from the vehicle to the center of the earth ( $R$ ) and the reference ellipsoid. Altitude is the distance from the subvehicle point to the center of gravity of the vehicle.

The longitude and geodetic latitude refer to the subvehicle point. The local horizontal plane is defined as the plane perpendicular to the radius vector from the vehicle to the center of the earth. Azimuth is the angle between the projection of the velocity vector into the local horizontal plane and the north direction in this plane. Elevation is the angle between the velocity vector and the local horizontal plane and is positive above the horizontal plane.

Range is, to a high degree of approximation, the shortest distance along the reference ellipsoid between the launch site and the subvehicle point. The earth model used for all the calculations

except range was the Clarke Ellipsoid of 1866. The range given in this report was computed by replacing the ellipsoid with a sphere of an appropriate radius. The equation used to compute this range is as follows:

$$\text{Range} = \frac{1}{2} (r_o + r_t) R_a$$

where:  $r_o$  = radius of earth at launch site  
 $r_t$  = radius of earth at subvehicle point  
 $R_a$  = angle between the two radii (radians).

The Geographic Coordinate System is shown in Figure 23.

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APPROVAL

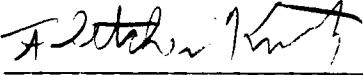
SATURN SA-5 POSTFLIGHT TRAJECTORY (U)

By Gerald R. Riddle and Michael Naumcheff

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